DIRECT TESTIMONY AND EXHIBITS OF

DAVID C. PARCELL

ON BEHALF OF

THE SOUTH CAROLINA OFFICE OF REGULATORY STAFF

DOCKET NO. 2019-290-WS

IN RE: APPLICATION OF BLUE GRANITE WATER COMPANY

FOR ADJUSTMENT OF RATES AND CHARGES

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME, OCCUPATION, AND BUSINESS ADDRESS.

A. My name is David C. Parcell. I am a Principal and Senior Economist of Technical Associates, Inc. My address is 2218 Worchester Road, Midlothian, Virginia 23113.

Q. PLEASE SUMMARIZE YOUR EDUCATIONAL BACKGROUND AND PROFESSIONAL EXPERIENCE.

A. I hold B.A. (1969) and M.A. (1970) degrees in economics from Virginia Polytechnic Institute and State University (Virginia Tech) and a M.B.A. (1985) from Virginia Commonwealth University. I have been a consulting economist with Technical Associates since 1970. I have provided cost of capital testimony in public utility ratemaking proceedings dating back to 1972. In this regard, I have previously filed testimony and/or testified in over 575 utility proceedings before about 50 regulatory agencies in the United States and Canada. Exhibit DCP-1 provides a more complete description of my education and relevant work experience.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE PUBLIC SERVICE COMMISSION OF SOUTH CAROLINA ("COMMISSION")?

A. Yes. I have testified before the Commission a number of times, going back to 1980.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. The South Carolina Office of Regulatory Staff ("ORS") retained me to evaluate the cost of capital aspects of Blue Granite Water Company ("BGWC" or "Company"), relative to the current rate increase filing. I have performed independent studies and am making recommendations of the current cost of capital for BGWC. In addition, since BGWC is a subsidiary of Corix Regulated Utilities Inc. ("CRU," formerly named Utilities, Inc.) and, ultimately by Corix Infrastructure, Inc. ("CII"), I have also evaluated these entities in my analyses.

Q. HAVE YOU PREPARED AN EXHIBIT IN SUPPORT OF YOUR TESTIMONY?

A. Yes, I have prepared one exhibit, labeled Exhibit DCP-2, identified as Schedule 1 through Schedule 13. The information contained in this exhibit is correct to the best of my knowledge and belief.

II. RECOMMENDATIONS AND SUMMARY

Q. WHAT ARE YOUR RECOMMENDATIONS IN THIS PROCEEDING?

A. My overall cost of capital recommendations for BGWC are shown on Schedule 1 and are summarized as follows:

Item	Percent	Cost	Weighted Cost
Debt	47.09%	5.73%	2.70%
Common Equity	52.91%	8.90%-10.00%	4.71-5.29%
Total	**100.0%**		**7.41-7.99%**

Recommended cost of capital: **7.70% with 9.45% ROE**

BGWC's application requests a cost of capital of 8.36 percent and a cost of equity of 10.70 percent.

Q. PLEASE SUMMARIZE YOUR ANALYSES AND CONCLUSIONS.

A. This proceeding is concerned with BGWC's regulated water and wastewater utility operations in South Carolina. My analyses concern the Company's cost of capital. The first step in performing these analyses is to develop the appropriate capital structure. BGWC proposes use of a capital structure with 47.09 percent debt and 52.91 percent common equity, which reflects the test year ending June 30, 2019 ("Test Year") capital structure ratios of CRU (immediate parent and provider of capital to BGWC). I also use this capital structure.

The second step in a cost of capital calculation is to determine the embedded cost rate of debt. BGWC proposes to use a cost rate of 5.73 percent for debt, the cost rate of CRU as of June 30, 2019. I use this cost rate in my analyses.

The third step in the cost of capital calculation is to estimate the cost of equity. I employ three recognized methodologies to estimate BGWC's cost of equity, each of which I apply to three proxy groups of water utilities. These three methodologies and my findings are:

Methodology	Range
Discounted Cash Flow ("DCF")	8.2-8.9%
Capital Asset Pricing Model ("CAPM")	5.9-6.2%
Comparable Earnings ("CE")	9.0-10.0%

Based upon these findings, I conclude that BGWC's cost of equity is within a range of 8.9 percent to 10.0 percent (9.45 percent mid-point), which is based upon the upper-end of my DCF results and upper-end of my CE results models.[1] I use the upper ends of my DCF and CE ranges in order to give some consideration to any perceived unique attributes of BGWC.

Combining these three steps into the weighted cost of capital results in an overall cost of capital of 7.41 percent to 7.99 percent (which incorporates an 8.9 percent to 10.0 percent cost of equity). My specific cost of capital recommendation is the mid-point of this range, or 7.70 percent (9.45 percent cost of equity).

III. ECONOMIC/LEGAL PRINCIPLES AND METHODOLOGIES

Q. WHAT ARE THE PRIMARY ECONOMIC AND REGULATORY PRINCIPLES THAT ESTABLISH THE STANDARDS FOR DETERMINING A FAIR RATE OF RETURN FOR A REGULATED UTILITY?

A. Public utility rates are normally established in a manner designed to allow the recovery of their costs, including capital costs. This is frequently referred to as "cost of service" ratemaking. Rates for regulated public utilities traditionally have been primarily established using the "rate base – rate of return" concept. Under this method, utilities are

[1]As I indicate in a later section, my cost of equity recommendation does not directly incorporate the CAPM results, which I believe to be somewhat low at this time, relative to the DCF and CE results.

allowed to recover a level of operating expenses, taxes, and depreciation deemed reasonable for rate-setting purposes, and are granted an opportunity to earn a fair rate of return on the assets utilized (*i.e.*, rate base) in providing service to their customers.

The rate base is derived from the asset side of the utility's balance sheet as a dollar amount and the rate of return is developed from the liabilities/owners' equity side of the balance sheet as a percentage. Thus, the revenue impact of the cost of capital is derived by multiplying the rate base by the rate of return, including income and other taxes.

The rate of return is developed from the cost of capital which is estimated by weighting the capital structure components (*i.e.*, debt, and common equity) by their percentages in the capital structure and multiplying these values by their cost rates. This is also known as the weighted cost of capital.

Technically, "fair rate of return" is a regulatory and accounting concept that refers to an *ex post facto* (after the fact) earned return on an asset base while the cost of capital is an economic and financial concept which refers to *ex ante facto* (before the fact) expected, or required, return on a capital base. In regulatory proceedings, however, the two terms are often used interchangeably, and I have equated the two concepts in my testimony.

From an economic standpoint, a fair rate of return is normally interpreted to mean that an efficient and economically-managed utility will be able to maintain its financial integrity, attract capital, and establish comparable returns for similar risk investments. These concepts are derived from economic and financial theory and are generally implemented using financial models and economic concepts.

With regard to the regulatory standards, my testimony is based on my understanding that two United States Supreme Court decisions provide the controlling

standards for a fair rate of return. The first decision is *Bluefield Water Works and Improvement Co. v. Public Serv. Comm'n of West Virginia*, 262 U.S. 679 (1923). In this decision, the Court stated:

> The annual rate that will constitute just compensation depends upon many circumstances and must be determined by the exercise of fair and enlightened judgment, having regard to all relevant facts. A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties. A rate of return may be reasonable at one time, and become too high or too low by changes affecting opportunities for investment, the money market, and business conditions generally.

It is generally understood that the *Bluefield* decision established the following standards for a fair rate of return: comparable earnings, financial integrity, and capital attraction. It also noted that required returns change over time, and there is an underlying assumption that the utility be operated efficiently.

The second decision is *Federal Power Comm'n v. Hope Natural Gas Co.*, 320 U.S. 591 (1942). In that decision, the Court stated:

> The rate-making process under the [Natural Gas] Act, *i.e.*, the fixing of 'just and reasonable' rates, involves a balancing of the investor and consumer interests. . . . From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock. By this standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to

assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.

The Commission has looked to the *Hope* and *Bluefield* standards as guidance for setting rates. For example, in both Docket No. 2013-59-E, a Duke Energy Carolinas, LLC rate case from 2013, and in Docket No. 2016-227-E, a Duke Energy Progress, LLC rate case from 2016, the Commission stated:

> In setting rates, the Commission must determine a fair rate of return that the utility should be allowed the opportunity to earn after recovery of the expenses of utility operations. The legal standards applicable to this determination are set forth in Fed. Power Comm'n v. Hope Natural Gas Co., 320 U.S. 591, 602-603 (1944) and Bluefield Water Works and Improvement Co. v. Pub. Serv. Comm'n of W. VA., 262 U.S. 679, 692-93 (1923). These standards were adopted by the South Carolina Supreme Court in Southern Bell Tel. & Tel. Co. v. S.C. Pub. Serv. Comm'n, 270 S.C. 590, 595-96, 244 S.E.2d 278, 281 (1978). The Court stated:
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> What annual rate will constitute just compensation depends upon many circumstances, and must be determined by the exercise of a fair and enlightened judgment, having regard to all relevant facts. A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties; but it has no constitutional right to profits such as are realized or anticipated in highly profitable enterprises or speculative ventures. The return should be reasonably sufficient to assure confidence in the financial soundness of the utility and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise the money necessary for the proper discharge of its public duties…
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> Southern Bell Tel., 270 S.C. at 595-96, 244 S.E.2d at 281 (quoting Bluefield, 262 U.S. at 692-93). These cases also establish that the process of determining rates of return requires the exercise of informed judgment by the Commission. The South Carolina Supreme Court has held that:
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> [T]he Commission was not bound to the use of any single formula or combination of formulae in determining rates. Its ratemaking function,

> moreover, involves the making of 'pragmatic adjustments' . . .. Under the statutory standard of 'just and reasonable' it is the result reached not the method employed which is controlling. . .. The ratemaking process under the Act, *i.e.*, the fixing of 'just and reasonable' rates, involves the balancing of the investor and the consumer interests. Thus we stated in the Natural Gas Pipeline Co. case that 'regulation does not insure that the business shall produce net revenues.' . . . [B]ut such considerations aside, the investor interest has a legitimate concern with the financial integrity of the company whose rates are being regulated. From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on debt and dividends on the stock. . . . By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and to attract capital.
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> Southern Bell Tel., 270 S.C. at 596-97, 244 S.E. 2d at 281 (quoting Hope Natural Gas Co., 320 U.S. at 602-03). These principles have been employed by the Commission and the South Carolina Courts consistently.

S.C. Pub. Serv. Comm'n Docket No. 2016-227-E, Order No. 2016-871 (Dec. 21, 2016), p. 19-21; S.C. Pub. Serv. Comm'n Docket No. 2013-59-E, Order No. 2013-661 (Sept. 18, 2013), p. 19-20.

The three economic and financial parameters in the *Bluefield* and *Hope* decisions – comparable earnings, financial integrity, and capital attraction – reflect the economic criteria encompassed in the "opportunity cost" principle of economics. The opportunity-cost principle provides that a utility and its investors should be afforded an opportunity (not a guarantee) to earn a return commensurate with returns they could expect to achieve on investments of similar risk. The opportunity-cost principle is consistent with the fundamental premise on which regulation rests, namely, that it is intended to act as a surrogate for competition.

Q. HOW CAN THE *BLUEFIELD* AND *HOPE* PARAMETERS BE EMPLOYED TO ESTIMATE THE COST OF CAPITAL FOR A UTILITY?

A. Neither the courts nor economic/financial theory has developed exact and mechanical procedures for precisely determining the cost of capital. This is the case because the cost of capital is an opportunity cost and is prospective-looking, which dictates that it must be estimated. However, there are several useful models that can be employed to assist in estimating the cost of common equity ("return on equity" or "ROE"), which is the capital cost component that is the most difficult to estimate. These include the DCF, CAPM, CE, and risk premium ("RP") methods. I have not directly employed a RP model in my analyses although, as discussed later, my CAPM analysis is a form of the RP methodology. I describe each of these methodologies in more detail later in my testimony.

IV. GENERAL ECONOMIC CONDITIONS

Q. ARE ECONOMIC AND FINANCIAL CONDITIONS IMPORTANT IN DETERMINING THE COSTS OF CAPITAL FOR A PUBLIC UTILITY?

A. Yes. The costs of capital for both fixed-cost (debt and preferred stock) components and common equity are determined in part by current and prospective economic and financial conditions. At any given time, each of the following factors has an influence on the costs of capital:

- The level of economic activity (*i.e.*, growth rate of the economy);
- The stage of the business cycle (*i.e.*, recession, expansion, or transition);
- The level of inflation;
- The level and trend of interest rates; and,
- Current and expected economic conditions.

My understanding is that this position is consistent with the *Bluefield* decision, which noted "[a] rate of return may be reasonable at one time and become too high or too low by changes

affecting opportunities for investment, the money market, and business conditions generally."[2]

Q. WHAT INDICATORS OF ECONOMIC AND FINANCIAL ACTIVITY DID YOU EVALUATE IN YOUR ANALYSES?

A. I examined several sets of economic statistics from 1975 to the present. I chose this time period because it permits the evaluation of economic conditions over four full business cycles, plus the current cycle, allowing for an assessment of changes in long-term trends. Consideration of economic/financial conditions over a relatively long period of time allows me to assess how such conditions have impacted the level and trends of the costs of capital. This period also approximates the beginning and continuation of active rate case activities by public utilities that generally began in the mid-1970s.

A business cycle is commonly defined as a complete period of expansion (recovery and growth) and contraction (recession). A full business cycle is a useful and convenient period over which to measure levels and trends in long-term capital costs because it incorporates the cyclical (*i.e.*, stage of business cycle) influences and, thus, permits a comparison of structural (or long-term) trends.

Q. PLEASE DESCRIBE THE TIMEFRAMES OF THE FOUR PRIOR BUSINESS CYCLES AND THE CURRENT CYCLE.

[2] *Bluefield*, 262 U.S. at 693.

A. The four prior complete cycles and current cycle cover the following periods:

Business Cycle	Expansion Cycle	Contraction Period
1975-1982	Mar. 1975-July 1981	Aug. 1981-Oct. 1982
1982-1991	Nov. 1982-July 1990	Aug. 1990-Mar. 1991
1991-2001	Mar. 1991-Mar. 2001	Apr. 2001-Nov. 2001
2001-2009	Nov. 2001-Nov. 2007	Dec. 2007-June 2009
Current	July 2009 -	

Source: The National Bureau of Economic Research, "U.S. Business Cycle Expansions and Contractions."[3]

Q. DO YOU HAVE ANY GENERAL OBSERVATIONS CONCERNING THE RECENT TRENDS IN ECONOMIC CONDITIONS AND THEIR IMPACT ON CAPITAL COSTS OVER THIS BROAD PERIOD?

A. Yes, I do. From the early 1980s until the end of 2007, the United States economy enjoyed general prosperity and stability. This period was characterized by longer economic expansions, relatively tame contractions, low and declining inflation, and declining interest rates and other capital costs.

However, in 2008 and 2009 the economy declined significantly, initially as a result of the 2007 collapse of the "sub-prime" mortgage market and the related liquidity crisis in the financial sector of the economy. Subsequently, this financial crisis intensified with a more broad-based decline, initially based on a substantial increase in petroleum prices and a dramatic decline in the U.S. financial sector of the economy.

This decline has been described as the worst financial crisis since the Great Depression of the 1930s and has been referred to as the "Great Recession." Beginning in 2008, the U.S. and other governments implemented unprecedented policies to attempt to

[3] http://www.nber.org/cycles/cyclesmain.html.

correct or minimize the scope and effects of this recession. Some of these policies are still in effect.

Q. PLEASE DESCRIBE RECENT AND CURRENT ECONOMIC AND FINANCIAL CONDITIONS AND THEIR IMPACT ON THE COSTS OF CAPITAL.

A. One impact of the Great Recession has been a reduction in actual and expected investment returns and a corresponding reduction in capital costs. This decline is evidenced by a decline in both short-term and long-term interest rates and the expectations of investors and is reflected in cost of capital model results (such as DCF, CAPM, and CE). Regulatory agencies throughout the U.S. have recognized the decline in capital costs by authorizing lower ROEs for regulated utilities in each of the last several years.[4]

Schedule 2 of Exhibit DCP-2 shows several sets of relevant economic and financial statistics for the cited time periods. Page 1 contains general macroeconomic statistics, page 2 shows interest rates, and page 3 contains equity market statistics.

Page 1 shows that in 2007 the economy stalled and subsequently entered a significant decline, as indicated by the lower growth rate in real (*i.e.*, adjusted for inflation) Gross Domestic Product ("GDP"), lower levels of industrial production, and an increase in the unemployment rate. This recession lasted until mid-2009, making it a longer-than-normal, as well as a much deeper, recession. Since then, economic growth has been somewhat erratic, and the economy has grown more slowly than in prior expansions. On the other hand, the current expansion has now reached the longest period of any expansion in recent financial history.

[4] Regulatory Research Associates, "Regulatory Focus." April 11, 2019.

Page 1 also shows the rate of inflation. As reflected in the Consumer Price Index ("CPI"), inflation rose significantly during the 1975-1982 business cycle and reached double-digit levels in 1979-1980. The rate of inflation has declined substantially since 1981. Since 2008, the CPI has been 3 percent or lower on an annual basis, with 2014 and 2015 growth below 1 percent, 2016 and 2017 growth at 2.1 percent, and 2018 growth at 1.9 percent. It is thus apparent that the rate of inflation has generally been declining over the past several business cycles. Recent and current levels of inflation are at the lowest levels of the past 35 years, which is reflective of lower capital costs.[5]

Q. WHAT HAVE BEEN THE TRENDS IN INTEREST RATES OVER THE FOUR PRIOR BUSINESS CYCLES AND AT THE CURRENT TIME?

A. Page 2 shows several series of interest rates. Both short-term and long-term rates rose sharply to record levels in 1975-1982 when the inflation rate was high. Interest rates have declined substantially in conjunction with the corresponding declines in inflation since the early 1980s.

From 2008 to late 2015, the Federal Reserve System ("Federal Reserve") maintained the Federal Funds rate (*i.e.*, short-term interest rate) at 0.25 percent, an all-time low. Following much anticipation, the Federal Reserve subsequently raised the Federal Funds rate on nine occasions between December of 2015 and December of 2018.[6] In July, September and October of 2019, on the other hand, the Federal Reserve again reduced the

[5] The rate of inflation is one component of interest rate expectations of investors, who generally expect to receive a return in excess of the rate of inflation. Thus, a lower rate of inflation has a downward impact on interest rates and other capital costs.

[6] The Fed Funds increases took place in December 2015, December 2016, March 2017, June 2017, December 2017, March 2018, June 2018, September 2018, and December 2018. Subsequent reduction took place in July 2019, September 2019 and October 2019.

Federal Funds rate on three separate occasions. The Federal Reserve also purchased U.S. Treasury securities to stimulate the economy.[7]

As seen on page 2, since 2011 both U.S. and public utility bond yields have declined to their lowest levels in the past four business cycles and in more than 35 years. Even with the "tapering" and eventual ending of the Federal Reserve's Quantitative Easing program, as well as the Federal Reserve's raising of the Federal Funds rate (prior to again lowering this rate), interest rates have remained relatively low. The rates on U.S. Treasury and public utility securities increased somewhat in the first several months of 2019, before falling over the past several months. Both government and utility long-term lending rates remain near historically low levels, again reflective of lower capital costs. In addition, current interest rates for many utilities are lower than historic (embedded) cost rates.

Q. WHAT DOES SCHEDULE 2 SHOW FOR TRENDS OF COMMON SHARE PRICES?

A. Page 3 shows several series of common stock prices and ratios. These indicate that stock prices were essentially stagnant during the high inflation/high interest rate environment of the late 1970s and early 1980s. The 1983-1991 business cycle and the more recent cycles witnessed a significant upward trend in stock prices. The beginning of the recent financial crisis saw stock prices decline precipitously as stock prices in 2008 and early 2009 were down significantly from peak 2007 levels, reflecting the financial/economic crisis. Beginning in the second quarter of 2009, prices recovered substantially and ultimately reached and exceeded the levels achieved prior to the "crash."

[7] This is referred to as Quantitative Easing which was comprised of three "rounds". In "round" 3, known as QE3, the Federal Reserve initially purchased some $85 billion of U.S. Treasury Securities per month in order to stimulate the economy. The Federal Reserve eventually "tapered" its purchase of U.S. Treasury securities through October 2014, at which time Quantitative Easing ended.

On the other hand, recent equity markets have been somewhat volatile, including much of 2018. As an example of this, the end of 2018 witnessed significant declines in stock prices, with many indexes declining more than 20 percent (*i.e.*, a "bear" market). Since the end of 2018, stock indices have recovered with many indices reaching record high levels in 2019.

Q. WHAT CONCLUSIONS DO YOU DRAW FROM YOUR DISCUSSION OF ECONOMIC AND FINANCIAL CONDITIONS?

A. Recent economic and financial circumstances have differed from any that have prevailed since at least the 1930s. Concurrent with the Great Recession, there was a decline in capital costs and returns which significantly reduced the value of most retirement accounts, investment portfolios, and other assets. One significant aspect of this has been a decline in investor expectations of returns[8] even with the return of stock prices to levels achieved prior to the "crash."[9] This is evidenced by: (1) lower interest rates on bank deposits; (2) lower interest rates on U.S. Treasury and utility bonds; and (3) lower authorized returns on equity by regulatory commissions. Finally, as noted above, utility bond interest rates are currently at levels well below those prevailing prior to the financial crisis of late 2008 to early 2009 and remain near the lowest levels in the past 35 years and are also generally lower than the embedded cost rates for most utilities, including BGWC.

Q. HOW DO THESE ECONOMIC/FINANCIAL CONDITIONS IMPACT THE DETERMINATION OF A RETURN ON EQUITY FOR REGULATED UTILITIES?

[8] *See*, *e.g.*, Kiplinger's Personal Finance, "Investors Brace for Smaller Gains, Focus on Long-Term," August 30, 2015.
[9] *See e.g.*, Vanguard News & Perspectives. "Stabilization, Not Stagnation: Expect Modest Returns," March 30, 2017, www.personal.vanguard.com/us/insights/artical/infographic-stabilization-032017.

A. The costs of capital for regulated utilities have declined in recent years. In addition, the results of the traditional ROE models (*i.e.*, DCF, CAPM, CE and RP) are lower than was the case prior to the Great Recession. In light of this, it is not surprising that the average ROEs authorized by state regulatory agencies have declined and continued to remain relatively low through 2018, as follows:[10]

	Electric		Natural Gas	
Year	Average	Median	Average	Median
2007	10.32%	10.23%	10.22%	10.20%
2008	10.37%	10.30%	10.39%	10.45%
2009	10.52%	10.50%	10.22%	10.26%
2010	10.29%	10.26%	10.15%	10.10%
2011	10.19%	10.14%	9.91%	10.05%
2012	10.02%	10.00%	9.93%	10.00%
2013	9.82%	9.82%	9.68%	9.72%
2014	9.76%	9.75%	9.78%	9.78%
2015	9.60%	9.53%	9.60%	9.68%
2016	9.60%	9.60%	9.53%	9.50%
2017	9.68%	9.60%	9.73%	9.60%
2018	9.56%	9.57%	9.60%	9.60%

V. BLUE GRANITE WATER COMPANY'S OPERATIONS AND CAPITAL STRUCTURE/COST OF DEBT

Q. PLEASE DESCRIBE BGWC AND ITS OPERATIONS.

A. BGWC is a regulated public utility that provides water and wastewater services to about 28,000 customers in 16 counties across South Carolina.[11] Until 2019, BGWC was known as Carolina Water Service, Inc.

Q. WHAT IS THE OWNERSHIP STRUCTURE OF BGWC?

[10] Regulatory Research Associates, "Regulatory Focus", January 31, 2019, General Rate Cases.
[11] Blue Granite Water Co. website.

A. BGWC is a direct subsidiary of CRU[12] which in turn is an indirect subsidiary of CII. In addition to BGWC. CRU has 15 utility subsidiaries in several other states. CII is a diversified, privately held corporation owned by the British Columbia Investment Corporation ("BCI"). This entity "designs, supplies, builds, installs, finances and operates local utility infrastructure on behalf of municipal, institutional, military, and private-sector customers."[13] It is apparent that some of CII's operations are regulated utilities and others are non-regulated entities.

Q. HOW IS BGWC WATER FINANCED?

A. All of BGWC's capital is provided by CRU.

Q. HAVE YOU EVALUATED THE CAPITAL STRUCTURE OF CORIX REGULATED UTILITIES?

A. Yes. I have examined the five-year historic (2014-2018) and Test Year capital structure ratios of CRU (previously named Utilities, Inc.). These are shown on Schedule 3 of Exhibit DCP-2. I have summarized below the common equity ratios for CRU:

Year	Excl. S-T Debt
2014	51.0%
2015	52.9%
2016	52.8%
2017	59.0%
2018	51.2%
6/30/2019	52.91%

[12] Until 2019, CRU was known as Utilities, Inc.
[13] Corix website.

Q. HAVE YOU ALSO CONDUCTED ANALYSES OF THE HISTORIC AND PROJECTED COMMON EQUITY RATIOS OF THE PROXY GROUPS USED TO ESTIMATE BGWC'S COST OF EQUITY?

A. Yes, I have. Schedule 4 of Exhibit DCP-2 shows the five-year historic (2014-2018) and estimated 2022-2024 common equity ratios (excluding short-term debt) for the proxy groups of water utilities identified in a later section of my testimony. The summary results are as follows:

	Five-Year Historic		2022-24 Estimated	
Group	Average	Median	Average	Median
Value Line Group	54.9%	56.2%	56.6%	60.5%
Parcell Group	55.9%	56.5%	56.4%	60.5%
D'Ascendis Group	56.0%	56.6%	57.5%	62.5%

These results indicate average and median common equity ratios between 54 percent and 62 percent. These are lower than BGWC's most recent ratios, but are similar to BGWC's earlier (*i.e.*, 2017) ratios.

Q. WHAT CAPITAL STRUCTURE HAS BGWC REQUESTED IN THIS PROCEEDING?

A. BGWC is proposing the use of CRU's actual Test Year capital structure ratios, which are 47.09 percent debt and 52.91 percent equity.

Q. WHAT CAPITAL STRUCTURE DO YOU USE IN YOUR COST OF CAPITAL ANALYSES?

A. I also propose that the Commission utilize a capital structure with 52.91 percent equity and 47.09 percent debt. This reflects the actual capital structure of CRU (source of

financing for BGWC) and is similar to the average capital structure ratios of the proxy groups of water utilities (*i.e.*, a "market-driven" capital structure).

Q. WHAT IS THE COST OF DEBT OF BGWC?

A. The company's testimony utilizes a cost of long-term debt of 5.73 percent – the cost of debt for CRU as of June 30, 2019.

Q. WHAT COST OF DEBT DO YOU UTILIZE IN YOUR COST OF CAPITAL ANALYSES?

A. I use this cost rates in my analyses.

VI. SELECTION OF PROXY GROUPS

Q. HOW HAVE YOU ESTIMATED THE COST OF EQUITY FOR BGWC?

A. BGWC is a subsidiary of CRU, and ultimately CII, none of which are publicly-traded. Consequently, it is not possible to directly apply cost of equity models to any of these entities. Generally, groups of comparison or "proxy" companies are analyzed as a substitute for BGWC to determine its cost of common equity.

I have examined three such groups for comparison of BGWC. I selected one group of water utilities covered by Value Line (Standard Edition) and using the criteria listed on Schedule 5 of Exhibit DCP-2. These criteria are as follows:

1) Primarily a regulated water utility in U.S.;
2) Common equity ratio 40% or greater;
3) Value Line Safety of 2 or 3;
4) S&P's bond ratings of A or AA;
5) Currently pays dividends, and has not reduced dividends in past five years; and,

6) Not currently involved in major merger.

Second, I have conducted studies of the cost of equity for the water utilities group cited by Value Line (in both the Standard and Small and Mid-Cap Editions). I note that the Value Line group contains SJW Corp. that recently was involved in a significant merger (with Connecticut Water). In addition, Aqua America is currently in the process of acquiring several natural gas utilities, which will significantly change its operational and risk profile. Finally, the inclusion of Artesian Resources (from the Small and Mid-Cap Edition of Value Line) does not include the same degree of information as those companies in the Standard Edition.

Third, I have also considered the proxy group of water utilities employed by BGWC witness D'Ascendis in his analyses. In doing so, I note that his proxy group only differs from my primary proxy group in that witness D'Ascendis includes Artesian Resources.

VII. DISCOUNTED CASH FLOW ANALYSIS

Q. WHAT IS THE THEORY AND METHODOLOGICAL BASIS OF THE DCF MODEL?

A. The DCF model is one of the oldest and most commonly-used models for estimating the ROE for public utilities. The DCF model is based on the "dividend discount model" of financial theory, which maintains that the value (price) of any security or commodity is the discounted present value of all future cash flows.

The DCF model is based upon two fundamental principles. First, DCF is based on the postulate that investors value an asset on the basis of the future cash flows (*i.e.*, dividends and ultimate sales in the case of common stocks) they expect to receive from owning the asset. The second DCF principle is that investors value a dollar received in the

future less than a dollar received today (*i.e.*, the "time value of money"). Within this context, the current price of a company's stock is equal to the present value equivalent of the expected dividends and the proceeds from eventually selling the stock. The discount rate that equates the future anticipated dividends and future anticipated selling price with the current market price is the cost of common equity.

The DCF model is based upon the concept that the value of a share of stock is the discounted present worth of all the dividends to be received on that share. The equation is:

$$P = \frac{C_1}{(1+K_1)} + \frac{C_2}{(1+K_2)^2} + \cdots + \frac{C_n}{(1+K_n)^n}$$

where: P = current value or price

C_1 = cash flow in period 1, etc.

K_1 = discount rate in period 1, etc.

n = infinity

This relationship can be simplified if dividends are assumed to grow at a constant rate of g. As a result, the equation above can be reduced to:

$$P = \frac{D}{(K-g)}$$

which, when solved for K results in:

$$K = \frac{D}{P} + g$$

where: P = current price

D = current dividend rate

K = discount rate (cost of capital)

g = constant rate of expected growth

This formula essentially recognizes that the return expected or required by investors is comprised of two factors: the dividend yield (current income) and expected growth in dividends (future income).

Q. PLEASE EXPLAIN HOW YOU EMPLOY THE DCF MODEL.

A. I use the constant growth DCF model. In doing so, I combine the current dividend yield for each of the proxy utility stocks described in the previous section with several indicators of expected dividend growth.

Q. HOW DID YOU DERIVE THE DIVIDEND YIELD COMPONENT OF THE DCF EQUATION?

A. Several methods can be used to calculate the dividend yield component. These methods generally differ in the manner in which the dividend rate is employed (*i.e.*, current versus future dividends or annual versus quarterly compounding variant). I use a version of the quarterly compounding variant, which is expressed as follows:

$$Yield = \frac{D_0(1 + 0.5g)}{P_0}$$

This dividend yield component recognizes the timing of dividend payments and dividend increases.

The P_0 in my yield calculation is the average of the high and low stock price for each proxy company for the most recent three-month period (October - December 2019). The D_0 is the current annualized dividend rate for each proxy company.

Q. HOW DO YOU ESTIMATE THE DIVIDEND GROWTH COMPONENT OF THE DCF EQUATION?

A. The DCF model's dividend growth rate component is usually the most crucial and controversial element involved in using this methodology. The objective of estimating the

dividend growth component is to reflect the growth expected by investors that is embodied in the price (and yield) of a company's stock. As such, it is important to recognize that individual investors have different expectations and consider alternative indicators in deriving their expectations. This is evidenced by the fact that every investment decision resulting in the purchase of a particular stock is matched by another investment decision to sell that stock.

A wide array of indicators exists for estimating investors' growth expectations. As a result, it is evident that investors do not always use one single indicator of growth. It therefore is necessary to consider alternative dividend growth indicators in deriving the growth component of the DCF model. I have considered five indicators of growth in my DCF analyses. These are:

1) Years 2014-2018 (five-year average) earnings retention, or fundamental growth (per Value Line);
2) Five-year average of historic growth in earnings per share (EPS), dividends per share (DPS), and book value per share (BVPS) (per Value Line);
3) Years 2019, 2020 and 2022-2024 projections of earnings retention growth (per Value Line);
4) Years 2016-2018 to 2022-2024 projections of EPS, DPS, and BVPS (per Value Line); and
5) Five-year projections of EPS growth (per First Call).

I believe this combination of growth indicators is a representative and appropriate set with which to begin the process of estimating investor expectations of dividend growth for the groups of proxy companies. I also believe that these growth indicators reflect the

types of information that investors consider in making their investment decisions. As I indicated previously, investors have an array of information available to them, all of which would be expected to have some impact on their decision-making process.

Q. PLEASE DESCRIBE YOUR DCF CALCULATIONS.

A. Schedule 6 of Exhibit DCP-2 presents my DCF analysis. Page 1 shows the calculation of the "raw" (*i.e.*, prior to adjustment for growth) dividend yield for each proxy company. Pages 2 and 3 show the growth rates for the groups of proxy companies. Page 4 shows the DCF calculations, which are presented on several bases: mean, median, low and high values. These results can be summarized as follows:

	Mean	Median	Mean Low[14]	Mean High[15]	Median Low[16]	Median High[17]
Value Line Group	7.6%	7.3%	6.3%	8.8%	5.8%	8.5%
Parcell Group	7.2%	7.2%	5.8%	8.4%	5.5%	8.4%
D'Ascendis Group	7.2%	7.0%	6.1%	8.9%	5.6%	8.5%

I note that the individual DCF calculations shown on Schedule 6 should not be interpreted to reflect the expected cost of capital for individual companies in the proxy groups; rather, the individual values shown should be interpreted as alternative information considered by investors.

Q. WHAT DO YOU CONCLUDE FROM YOUR DCF ANALYSES?

A. The DCF rates resulting from the analysis of the proxy groups fall into a wide range between 5.5 percent and 8.9 percent. The highest DCF rates are 8.2 percent to 8.9 percent.

[14] Using the lowest mean growth rate.
[15] Using only the highest mean growth rate.
[16] Using the lowest median growth rate.
[17] Using the highest median growth rate.

I believe a range of 8.2 percent to 8.9 percent represents the current DCF-derived ROE for the proxy groups at this time. This range includes the highest DCF rate and exceeds the low and mean and median DCF rates. I recommend a DCF ROE of 8.9 percent for BGWC, which focuses on the highest DCF rates (*i.e.*, range of 8.2 percent to 8.9 percent) and exceeds the low and mean and median DCF rates.

I observe that the constant growth DCF model currently produces cost of equity results that are lower than has been the case in recent years. This is, in part, a reflection of the decline in capital costs (*e.g.*, in terms of interest rates). I believe that the constant-growth DCF model remains relevant and informative. It is also my personal experience that this model is used the most by cost of capital witnesses of all the available ROE models. Nevertheless, in order to give some consideration to any perceived unique attributes of BGWC, I have focused only on the highest of the DCF results in making my recommendations. As such, I have not given consideration to the lower calculated DCF results. In addition, I note that the 8.9 percent upper end of the DCF results includes the impact of the water utilities (*i.e.*, Aqua America and SJW) that neither myself nor Mr. D'Ascendis include in our respective proxy groups. As a result, my DCF conclusions are favorable to BGWC.

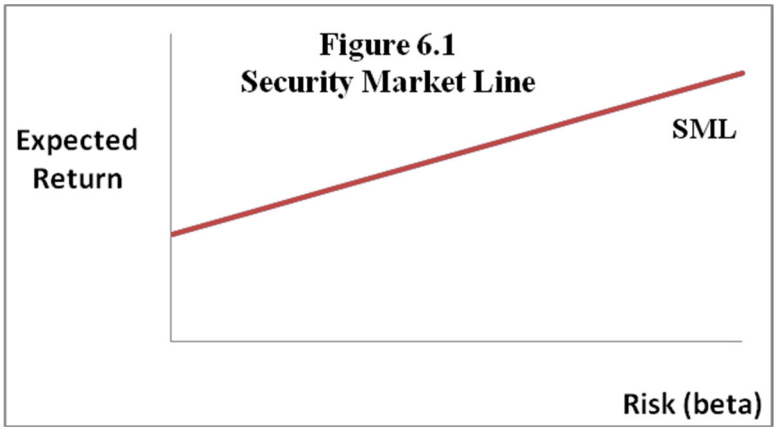
VIII. CAPITAL ASSET PRICING MODEL ANALYSIS

Q. PLEASE DESCRIBE THE THEORY AND METHODOLOGICAL BASIS OF THE CAPM.

A. The CAPM describes the relationship between a security's investment risk and its market rate of return. This relationship identifies the rate of return which investors expect

a security to earn so that its market return is comparable with the market returns earned by other securities that have similar risk.

The relationship is specified by the Security Market Line (SML). As indicated in the figure below, the SML indicates the relationship between each security's or portfolio's "beta" and its resulting expected return. The SML sets forth the "betas" and corresponding expected returns of all securities and portfolios of securities that are available in the capital market at a given moment in time.



Beta is an indicator of investment risk. It is a measure of the expected amount of change in a security's price that results from a change in the overall market's security prices. As such, beta indicates the security's variability of return relative to the return variability of the overall capital market.

Variability of market returns is a measure of risk and is caused by two general factors. First, changes in economic, social, and political conditions affect the risk structure and market prices of all securities. Changes in these factors consequently cause the market return to vary. This is referred to as market risk or systematic risk. Second, each company and industry have unique business and financial attributes, which also cause returns and

prices to vary. This is known as firm-specific risk or unsystematic (or non-systematic) risk.

Investors can, through diversification of their security holdings, substantially reduce or eliminate the return variation caused by the second general factor (*i.e.*, the unique business and financial attributes). However, the return variance or risk caused by the first factor (changes in economic, social, and political conditions) cannot be eliminated because changes in these factors impact all securities to some degree.

Consequently, in a diversified portfolio of securities, it is the risk associated with the first factor that commands the return premium to attract investor capital. Beta, a measure of a security's return variability relative to the return variability of the market as a whole, is an indicator of the risk associated with the first factor. The SML specifies the relationship between the non-diversifiable or systematic risk and the return premium required to be comparable with other securities of similar risk. This relationship is known as CAPM.

Q. HOW IS THE CAPM DERIVED?

A. The general form of the CAPM is:

$$K = R_f + \beta(R_m - R_f)$$

where: K = cost of equity

R_f = risk free rate

R_m = return on market

β = beta

R_m-R_f = market risk premium

The CAPM is a variant of the risk premium ("RP") method. I believe the CAPM is generally superior to the simple RP method because the CAPM specifically recognizes

the risk of a particular company or industry (*i.e.*, beta), whereas the simple RP method assumes the same cost of equity for all companies exhibiting similar bond ratings or other characteristics.

Q. WHAT DO YOU USE FOR THE RISK-FREE RATE?

A. The first input of the CAPM is the risk-free rate (R_f). The risk-free rate reflects the level of return that can be achieved without accepting any risk.

In CAPM applications, the risk-free rate is generally recognized by use of U.S. Treasury securities. Two general types of U.S. Treasury securities are often utilized as the R_f component -- short-term U.S. Treasury bills and long-term U.S. Treasury bonds.

I have performed CAPM calculations using the three-month average yield (October - December 2019) for 20-year U.S. Treasury bonds. I use the yields on long-term Treasury bonds since this matches the long-term perspective of ROE analyses. Over this three-month period, these bonds had an average yield of 2.10 percent.

Q. WHAT IS BETA AND WHAT BETAS DO YOU EMPLOY IN YOUR CAPM?

A. Beta is a measure of the relative volatility (and thus risk) of a particular stock in relation to the overall market. Betas less than 1.0 are considered less risky than the market, whereas betas greater than 1.0 are riskier. Utility stocks traditionally have had betas below 1.0. I utilize the most recent Value Line betas for each company in the proxy groups.

Q. HOW DO YOU ESTIMATE THE MARKET RISK PREMIUM COMPONENT?

A. The market risk premium component (R_m-R_f) represents the investor-expected premium of common stocks over the risk-free rate, or long-term government bonds. For the purpose of estimating the market risk premium, I considered alternative measures of returns of the S&P 500 (a broad-based group of large U.S. companies) and 20-year U.S.

Treasury bonds (*i.e.*, the same timeframe as employed in the Duff & Phelps source[18] used to develop risk premiums).

First, I compared the actual annual returns on equity of the S&P 500 with the actual annual yields of U.S. Treasury bonds. Schedule 7 of Exhibit DCP-2 shows the earned returns on equity for the S&P 500 group for the period 1978-2018 (all available years reported by S&P). This schedule also indicates the annual yields on 20-year U.S. Treasury bonds and the annual differentials (*i.e.*, risk premiums) between the S&P 500 and U.S. Treasury 20-year bonds. Based upon these returns, I conclude that the risk premium from this analysis is 7.26 percent.

I next considered the total returns (*i.e.*, dividends/interest plus capital gains/losses) for the S&P 500 group as well as for long-term[19] government bonds, as tabulated by Duff & Phelps, using both arithmetic and geometric means. I considered the total returns for the entire 1926-2018 period, which are as follows:

	S&P 500	L-T Gov't Bonds	Risk Premium
Arithmetic	11.9%	5.9%	6.0%
Geometric	10.0%	5.5%	4.5%

I conclude from this analysis that the expected risk premium is about 5.9 percent (*i.e.*, the average of all three risk premiums: 7.26 percent from Schedule 7; 6.0 percent arithmetic and 4.5 percent geometric from Duff & Phelps). I believe that a combination of arithmetic and geometric means is appropriate since investors have access to both types of

[18] 2018 SBBI Yearbook, Stocks, Bonds, Bills and Inflation. U.S. Capital Markets Performance by Asset Class 1926-2017, Duff and Phelps.
[19] 20 Year.

means[20] and presumably, both types are reflected in investment decisions and thus, stock prices and the cost of equity.

Q. PLEASE DEFINE THE CONCEPTS OF ARITHMETIC MEAN AND GEOMETRIC MEAN AND DESCRIBE WHY BOTH ARE RELEVANT TO INVESTORS.

A. The arithmetic mean is the average of period (*e.g.*, annual) changes in a statistic, such as investor returns. The geometric mean is a compound return of a period. The table below describes each for a sample period:

Period	Value	Return
1	$10	
2	$11	10% ($1 return on $10 base)
3	$12	9% ($1 return on $11 base)
4	$11	-8% (-$1 loss on $12 base)
5	$12	9% ($1 return on $11 base)

In this example, the arithmetic return is the average of the annual "Return" figures, which is 5 percent (*i.e.*, 10% +9% - 8% + 9% divided by 4). The arithmetic return thus gives consideration to the return level for each period.

The geometric return is the compound return over the four-year period, in which the value increased from $10 to $12, which is 20 percent over a four-year period, or 4.66 percent. The geometric mean thus is concerned with the total return over the period without consideration of individual period averages.

Arithmetic returns are always higher than geometric returns. This is the case since the individual period returns in an arithmetic sense are not "compounded" which requires

[20] For example, Value Line uses compound (*i.e.*, geometric) growth rates in its projection. In addition, mutual funds report growth rates on a compound basis.

them to be higher. Both types of returns are relevant to investors and both are reported to investors. Investors are concerned with period returns, but over a given period of time it is the geometric return that indicates their actual gain or loss. As a result, I consider both in my analyses of the risk premium component.

Q. WHAT ARE YOUR CAPM RESULTS?

A. Schedule 8 of Exhibit DCP-2 shows my CAPM calculations. The results are:

	Mean	Median
Value Line Group	6.0%	5.9%
Parcell Group	6.1%	6.2%
D'Ascendis Group	6.0%	6.1%

Q. WHAT IS YOUR CONCLUSION CONCERNING THE CAPM COST OF EQUITY?

A. The CAPM results collectively indicate a cost of equity of 5.9 percent to 6.2 percent (6.05 percent mid-point) for the groups of proxy utilities. I conclude that an appropriate CAPM cost of equity estimation for BGWC is 6.2 percent, the upper end of this range.

IX. COMPARABLE EARNINGS ANALYSIS

Q. PLEASE DESCRIBE THE BASIS OF THE CE METHODOLOGY.

A. This method is based upon the economic concept of "opportunity cost." As noted previously the cost of capital is an opportunity cost: the prospective return available to investors from alternative investments of similar risk. If, in the opinion of those who save and commit capital, the prospective return from a given investment is not equal to that available from other investments of similar risk, the available capital will tend to be shifted to the alternative investments. Through this mechanism, opportunity-cost-driven pricing

signals direct capital to its most productive uses; thus, a free enterprise system promotes an efficient allocation of scarce resources.

The established legal standards are consistent with the opportunity cost principle. The two Supreme Court cases most frequently cited (*Bluefield* and *Hope*) hold that: the return to the equity owners be sufficient to maintain the credit of the enterprise and confidence in its financial integrity; to permit the enterprise to attract required additional capital on reasonable terms; and, to provide the enterprise and its investors with an earnings opportunity commensurate with the returns available on investments in other enterprises having corresponding risks.

These three interrelated criteria constitute a succinct statement of the opportunity cost principle. An expected return on equity equal to that which can be realized on alternative investments of corresponding risk will, in turn, be sufficient to assure confidence in the financial integrity of the enterprise, to maintain its credit, and to permit it to attract new capital on reasonable terms.

The CE method is designed to measure the returns expected to be earned on the original cost book value of similar risk enterprises. This method provides a direct measure of the fair return, since it translates into practice the competitive principle upon which regulation rests. Thus, it provides a direct measure of the fair return, since it translates into practice the competitive principle upon which regulation rests.

The CE method normally examines the experienced and/or projected return on book common equity. The logic for examining returns on book equity follows from the use of original cost rate base regulation for public utilities, which uses a utility's book common equity to determine the cost of capital. This cost of capital is, in turn, used as the fair rate

of return which is then applied (multiplied) to the book value of rate base to establish the dollar level of capital costs to be recovered by the utility. This technique is thus consistent with the rate base, rate of return methodology used to set utility rates.

Q. HOW DO YOU APPLY THE CE METHODOLOGY IN YOUR ANALYSIS OF BGWC'S COST OF EQUITY?

A. I apply the CE methodology by examining realized returns on equity ("ROEs") for the groups of proxy companies, as well as unregulated companies, and evaluating investor acceptance of these returns by reference to the resulting market-to-book ratios ("M/Bs"). By use of this method, it is possible to assess the degree to which a given level of return equates to the cost of capital. It is generally recognized for utilities that an M/B of greater than one *(i.e*., 100 percent) reflects a situation where a company is able to attract new equity capital without dilution (*i.e.*, above book value). As a result, one objective of a fair ROE is the maintenance of stock prices at or above book value. It is also apparent that a utility M/B significantly above 1.0 protects existing shareholders from "dilution" that occurs when new shares of equity are sold for a price less than book value.

I further note that my CE analysis is based upon market data (through the use of M/Bs) and is thus essentially a market test. As a result, my CE analysis is not subject to the criticisms occasionally made by some who maintain that past earned ROEs do not necessarily represent the cost of capital. In addition, my CE analysis also uses prospective returns and thus is not strictly backward looking.

Q. IS YOUR CE ANALYSIS BASED UPON AN ASSUMPTION THAT ROES ARE THE ONLY FACTOR INFLUENCING STOCK PRICES AND M/BS?

A. No, it is not. I do not assume that earned ROEs are the sole determinant of M/Bs. Rather, I demonstrate that M/Bs are important to public utilities and they correspondingly reflect investors' assessment of the value of utility stocks relative to their respective book value, which is the basis on which their rates are established by regulatory commissions.

Q. WHAT TIME PERIODS DO YOU EXAMINE IN YOUR CE ANALYSIS?

A. My CE analysis considers the experienced ROEs of the proxy groups of utilities for the period 2002-2018 (*i.e.*, the last seventeen years). The CE analysis requires that I examine a relatively long period of time in order to determine trends in earnings over at least a full business cycle. Further, in estimating a fair level of return for a future period, it is important to examine earnings over a diverse period of time in order to avoid any undue influence from unusual or abnormal conditions that may occur in a single year or shorter period.

Therefore, in forming my judgment of the current ROE, I focused on two periods: 2009-2018 (the current business cycle) and 2002-2008 (the most recent past business cycle). I have also considered projected ROEs for 2019, 2020 and 2022-2024 (*i.e.*, the time periods estimated by Value Line).

Q. PLEASE DESCRIBE YOUR CE ANALYSIS.

A. Schedule 9 and Schedule 10 of Exhibit DCP-2 contain summaries of experienced ROEs and M/Bs for four groups of companies, while Schedule 11 presents a risk comparison of utilities versus unregulated firms.

Schedule 9 shows the achieved ROEs and M/Bs for the groups of proxy utilities. These can be summarized as follows:

	Value Line Group	Parcell Group	D'Ascendis Group
Historic ROE			
Mean	9.4-9.7%	9.3-9.7%	9.0-9.4%
Median	9.2-9.4%	9.1-9.4%	8.9-9.2%
Historic M/B			
Mean	222-232%	225-227%	216%
Median	210-217%	212-221%	206-207%
Prospective ROE			
Mean	9.6-12.4%	11.3-13.3%	11.3-13.3%
Median	10.5-12.5%	11.0-14.0%	11.0-14.0%

These results indicate that historic ROEs of 8.9 percent to 9.7 percent have been adequate to produce M/Bs of 206 percent to 232 percent for the groups of utilities. Furthermore, projected ROEs for 2019, 2020 and 2022-2024 are within a range of 9.6 percent to 14.0 percent for the utility groups. These relate to 2018 M/Bs of 300 percent or greater.

Q. DO YOU ALSO REVIEW THE EARNINGS OF UNREGULATED FIRMS?

A. Yes. As an alternative, I also examine the S&P's 500 group. This is a well-recognized group of firms that is widely utilized in the investment community and is indicative of the competitive sector of the economy. Schedule 10 of Exhibit DCP-2 presents the earned ROEs and M/Bs for the S&P 500 group over the past seventeen years (*i.e.*, 2002-2018). As this schedule indicates, over the two business cycle periods, this group's average ROEs ranged from 12.4 percent to 13.4 percent, with average M/Bs ranging between 242 percent and 275 percent.

Q. HOW CAN THE ABOVE INFORMATION BE USED TO ESTIMATE BGWC'S ROE?

A. The recent and prospective ROEs of the proxy utilities and S&P 500 groups can be viewed as an indication of the level of return realized and expected in the regulated and competitive sectors of the economy. In order to apply these returns to the cost of equity for the proxy utilities, however, it is necessary to compare the risk levels of the water utilities and the competitive companies. I do this in Schedule 11 of Exhibit DCP-2, which compares several risk indicators for the S&P 500 group and the water utility groups. The information in this schedule indicates that the S&P 500 group is riskier than the water utility proxy groups.

Q. WHAT ROE IS INDICATED BY YOUR CE ANALYSIS?

A. Based on recent and prospective ROEs and M/Bs, my CE analysis indicates that the required ROE for the proxy utilities is no more than 9.0 percent to 10.0 percent (9.5 percent mid-point). Recent ROEs of 8.9 percent to 9.7 percent have resulted in M/Bs more than 200 percent. Prospective ROEs of 9.6 percent to 14.0 percent have been accompanied by M/Bs over 300 percent. As a result, it is apparent that authorized returns below this level would continue to result in M/Bs of well above 200 percent. As I indicated earlier, the fact that M/Bs substantially exceed 100 percent indicates that historic and prospective ROEs of 9.5 percent reflect earning levels that are well above the actual earned ROE for those regulated companies. I also note that a company whose stock sells above book value can attract capital in a way that enhances the book value of existing stockholders, thus creating a favorable environment for financial integrity. My specific CE recommendation is the upper of this range, or 10.0 percent.

X. RETURN ON EQUITY RECOMMENDATION

Q. PLEASE SUMMARIZE THE RESULTS OF YOUR THREE COST OF EQUITY ANALYSES.

A. My three cost of equity analyses produced the following:

	Recommendation
DCF	8.9%
CAPM	6.2%
CE	10.0%

These results indicate an overall broad range of 6.2 percent to 10.0 percent. I recommend a ROE range of 8.9 percent to 10.0 percent for BGWC. This range includes my DCF result (8.9 percent), and my CE result (10.0 percent). Specifically, I recommend a cost of equity of 9.45 percent for BGWC, the mid-point of this range.

Q. IT APPEARS THAT YOUR CAPM RESULTS ARE LESS THAN YOUR DCF AND CE RESULTS. DO YOU DIRECTLY CONSIDER THE CAPM RESULTS IN DETERMINING THE COST OF EQUITY FOR BGWC?

A. Not at this time. I have conducted CAPM studies in my cost of equity analyses for many years. It is apparent that the CAPM results are currently significantly less than the DCF and CE results. There are two reasons for the lower CAPM results. First, risk premiums are lower currently than was the case in prior years. This is the result of lower equity returns that have been experienced beginning with the Great Recession and continuing over the past several years. This is also reflective of a decline in investor expectations of equity returns and risk premiums. Second, the level of interest rates on U.S. Treasury bonds (*i.e.*, the risk-free rate) has been lower in recent years. This is partially

the result of the actions of the Federal Reserve to stimulate the economy. This also impacts investor expectations of returns in a negative fashion.

I note that, initially, investors may have believed that the decline in U.S. Treasury yields was a temporary factor that would soon be replaced by a rise in interest rates. However, this has not been the case as interest rates have remained low and continued to decline for most of the past seven-plus years. As a result, it cannot be maintained that low interest rates (and low CAPM results) are temporary and do not reflect investor expectations. Consequently, the CAPM results should be considered as one factor in determining the cost of equity for BGWC. Even though I do not factor the CAPM results directly into my cost of equity recommendation, I do believe these lower results are indicative of the recent and continuing decline in utility costs of capital, including cost of equity.

XI. TOTAL COST OF CAPITAL

Q. WHAT IS THE TOTAL COST OF CAPITAL FOR BGWC?

A. Schedule 1 of Exhibit DCP-2 reflects the costs of capital for BGWC using my proposed capital structure, embedded cost of debt, as well as my cost of equity recommendations. The resulting total cost of capital is a range of 7.41 percent to 7.99 percent for BGWC. I recommend a cost of capital of 7.70 percent for BGWC, which incorporates a cost of equity of 9.45 percent.

XII. COMMENTS ON BGWC'S COST OF CAPITAL REQUESTS

Q. WHAT COST OF EQUITY HAS BGWC REQUESTED IN ITS APPLICATION?

A. The Company's filing requests a cost of equity of 10.70 percent. The 10.70 percent requested ROE is developed in the testimony of BGWC witness D'Ascendis, who recommends a ROE range of 10.2 percent to 10.7 percent.

Q. WHAT IS THE BASIS FOR MR. D'ASCENTIS' COST OF EQUITY RANGE?

A. BGWC's return on equity request is developed in the testimony of Mr. D'Ascendis as follows.[21]

Discounted Cash Flow Model	9.03%
Capital Asset Pricing Model	9.91%
Risk Premium Model	10.39%
Cost of Equity Models applied to Unregulated Companies	11.57%
Indicated Common Equity Cost	10.20%
Business Risk Adjustment	0.50%
Recommended Common Equity Cost Rate	10.70%

Mr. D'Ascendis' ROE range of 10.2 percent to 10.7 percent reflects the average conclusion of his respective ROE models without (*i.e.*, 10.2 percent) and with (*i.e.*, 10.70 percent) his 0.50 percent business risk adjustment.

Q. DO YOU HAVE ANY DISAGREEMENTS WITH ANY OR ALL OF MR. D'ASCENDIS' METHODOLOGIES AND RECOMMENDATIONS?

A. Yes. I have disagreements with several of his cost of equity methodologies and conclusions, as well as his proposed "business risk adjustment" for BGWC.

Q. PLEASE BEGIN WITH HIS DCF MODEL AND CONCLUSIONS.

[21] Direct Testimony of Dylan D'Ascendis, page 4, lines 1-25.

A. Mr. D'Ascendis' 9.03 percent DCF conclusion is shown on his Schedule DWD-3. This is similar to my DCF results.

Q. PLEASE DESCRIBE MR. D'ASCENDIS' RISK PREMIUM APPROACH AND CONCLUSIONS.

A. Mr. D'Ascendis performs two general types of risk premium analyses. First, he employs a Predictive Risk Premium Model ("PRPM") which produces a 10.97 percent ROE. Second, he develops his Adjusted Total Market Approach risk premium methodology to arrive a risk premium ROE of 9.80 percent. His risk premium method conclusions and recommendations is 10.39 percent, which gives equal weighting to the PRPM approach and the Adjusted Total Market Approach.[22]

Q. WHAT IS MR. D'ASCENDIS' FIRST RISK PREMIUM METHODOLOGY?

A. Mr. D'Ascendis first performs a relatively new type of risk premium approach, which is his Predictive Risk Premium Model ("PRPM") approach. This approach is relatively new and untried. To my knowledge, this method has primarily been used by Mr. D'Ascendis and other people in his firm.[23] I again note that, not only does his PRPM approach produce a much higher cost of equity result; the approach is also a component in his Adjusted Total Market Approach methodologies and has the effect of raising the results of this methodology as well.

The PPRM methodology, as proposed by Mr. D'Ascendis, develops a risk premium for each of his proxy companies using a "GARCH Coefficient." It is noteworthy that his

[22] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. 1, Schedule DWD-4, page 1.
[23] Response to Economics Request #3. Note that Robert B. Hevert is cited in this response as someone using the PPRM in cost of capital testimony. Mr. Hevert testified in two Duke Energy rate proceedings before this Commission in 2018 and did not use this methodology in his testimony in either of these proceedings.

PPRM risk premiums for his proxy companies range from 7.30 percent to 9.73 percent,[24] which are well above the demonstrated actual risk premiums cited in my CAPM analyses.[25]

Q. DO YOU AGREE WITH HIS ADJUSTED TOTAL MARKET APPROACH METHODOLOGY AND CONCLUSIONS?

A. No, I do not. Mr. D'Ascendis' Adjusted Total Market Return approach incorporates a risk premium of 5.45 percent, which in turn is the average of two risk premium studies[26]. The first is derived from several individual risk premium studies, as follows:[27]

Calculated equity risk premium based on total market using beta approach:

Ibbotson Equity Risk Premium	5.54%
Regression on Ibbotson Risk Premium Data	8.35%
Ibbotson Equity Risk Premium based on PRPM	9.05%
Equity Risk Premium Based on Value Line Summary & Index	9.75%
Equity Risk Premium Based on S&P 500 Cos	10.62%
Equity Risk Premium Based on Bloomberg S&P 500 Co.	10.48%
Average	8.96%
Adjusted Beta	0.66
Forecasted Risk Premium	**5.91%**

Of the six risk premia shown above, the 10.62 and 10.48 percent risk premiums based on the S&P 500 companies are clearly outliers and are based upon an assumed total return of 14.52 percent (Value Line) and 14.38 percent (Bloomberg) for this index[28] (well above the historical returns of 12 percent or less).

The second is based on five additional risk premium studies, which average 4.98 percent.[29]

[24] D'Ascendis Direct Exhibit No. 1, Schedule DWD-4.
[25] The 1926-2018 risk premiums developed by Duff & Phelps are 6.0% on an arithmetic basis and 4.5% on a geometric basis.
[26] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. 1, Schedule DWD-4, page 7.
[27] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. 1, Schedule DWD-4, page 8.
[28] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. 1, Schedule DWD-4. page 9.
[29] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. 1, Schedule DWD-4, page 12.

There are several problems with his methodologies. His use of total stock returns over the 1928-2018 period, in connection with bond yields over the same long period, seems to imply that investors in 2020 expect such relationships to be the same. There is no demonstration that current investors expect such relationships to exist at the current time. His methodology is also a mismatch since it compares holding period returns (*i.e.*, capital gains/losses plus income) with yields on bonds (*i.e.*, only income return). In addition, the 1928-2018 period was heavily influenced by the Great Depression, World War II, the high inflation/interest rate environment of the 1970s/1980s, etc. Such factors are not prevalent currently and have the effect of inflating risk premiums over those expected by investors. I believe Mr. D'Ascendis' analyses over-state the required risk premiums at the present time. In addition, I find it inconsistent on his part to defend use of historic data going back to 1928 in his risk premium and CAPM analyses, and to then ignore historic data in his DCF analyses. I do not see how an investor would place equal weight between returns in 1928 and 2018 in one type of analysis (*i.e.*, risk premium and CAPM) and then give no weight whatsoever to recent (*i.e.*, 5 years) experience in DCF analysis. I also disagree with Mr. D'Ascendis' use of projected equity returns, which are largely dependent on assumed stock market values. This is speculative.

Q. YOU INDICATE THAT MR. D'ASCENDIS' RISK PREMIUM AND CAPM ANALYSES USE FORECASTED YIELDS ON U.S. TREASURY AND UTILITY BONDS. WHY DO YOU DISAGREE WITH THIS?

A. It is proper to use the current yield, rather than a projected yield, as the risk-free rate in a risk premium and CAPM context. This is the case since the current yield is known and measurable and reflects investors' collective assessment of all relevant capital market

conditions. Prospective interest rates, in contrast, are not measurable and not achievable. For example, if the current yield on long-term utility bonds is 2.1 percent, this reflects the rate that investors can actually receive on their investment. Investors cannot receive a prospective yield on their investments since such a yield is not actual but rather speculative. I further note that Mr. D'Ascendis used actual bond yields, not projected yields, to derive his respective risk premiums. He is thus inconsistent in combining these risk premiums with projected bond yields

Use of the current yield in a DCF context is similar to using the current risk-free rate in a CAPM context. Analysts do not use prospective stock prices as the basis for the dividend yield in a DCF analysis, as use of prospective stock prices is speculative. Use of current stock prices is appropriate as this is consistent with the efficient market hypothesis that Mr. D'Ascendis cites in his testimony as "the foundation of modern investment theory."[30] Likewise, current levels of interest rates reflect all current information (*i.e.*, the efficient market hypothesis) and should be used as the risk-free rate in the CAPM.

Q. PLEASE DESCRIBE MR. D'ASCENDIS' CAPM ANALYSES.

A. Mr. D'Ascendis performs two sets of CAPM analyses. His first CAPM is a "traditional" CAPM, where he concludes that 9.47 percent is the CAPM cost. This uses a risk-free rate of 2.91 percent (projected yield on 30-year U.S. Treasury bonds), Value Line betas and a risk premium of 10.03 percent.[31] I note that current 30-year Treasury bonds currently yield well below 2.91 percent, which indicates that his prospective yield is excessive.

[30] Direct Testimony of Dylan W. D'Ascendis,
[31] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. 1, Schedule DWD-5, page 1.

I also disagree with the 10.03 percent market risk premium Mr. D'Ascendis employs in his CAPM analyses. This market risk premium is developed in a similar fashion to those in his risk premium analyses. For the same reasons cited above, Mr. D'Ascendis' risk premium values are over-stated.

Mr. D'Ascendis also performs an "empirical" CAPM analysis, wherein he assigns 75 percent weight to actual betas for the proxy group of electric utilities and a 25 percent weight to an assumed beta of 1.0 (*i.e.*, the market beta). I disagree with this empirical CAPM, since it arbitrarily ignores the actual betas of the proxy utilities and, instead, assigns hypothetical betas to them.

Q. WHAT IS YOUR RESPONSE TO MR. D'ASCENDIS' USE OF A "NON-PRICE REGULATED PROXY GROUP" IN HIS ROE ANALYSES?

A. Mr. D'Ascendis' final methodology applies DCF, CAPM and RP models to a group of fourteen "non-price regulated companies" which he describes as having similar betas to his group of water utilities contained in his proxy group.[32]

I disagree with his use of unregulated firms as a proxy group for the Companies. It is not proper to use non-regulated firms in the manner Mr. D'Ascendis proposes. This is the case since unregulated enterprises face different risk and operational characteristics than do utilities.

[32] Direct Testimony of Dylan W. D'Ascendis, Exhibit No. 1, Schedule DWD-6.

Q. MR. D'ASCENDIS PROPOSED INCLUSION OF A "BUSINESS RISK" ADJUSTMENT OF 0.50 PERCENT, DUE TO THE SMALLER SIZE OF BGWC, RELATIVE TO THE PROXY GROUP. DO YOU AGREE WITH THE PROPOSITION THAT BGWC SHOULD BE ENTITLED TO A SIZE OR BUSINESS RISK ADJUSTMENT?

A. No, I do not. BGWC's ratepayers should not be charged water rates which reflect an incremental return to reflect the size of the Company. Such an increment is not justified and not appropriate.

Q. IS IT PROPER TO COMPARE THE SIZE OF THE COMPANIES' TO THE WATER PROXY COMPANIES AND MAKE RISK COMPARISONS BASED UPON THE SIZE DIFFERENTIALS BETWEEN THEM?

A. No, it is not proper. Many of the proxy water utilities have multiple subsidiaries that operate in different jurisdictions. Following Mr. D'Ascendis' reasoning, each of the subsidiaries of the proxy water utilities should be considered as riskier than the proxy group since, by definition, they would have to be smaller. This reasoning is flawed, since these individual water company subsidiaries do not raise their equity capital directly from investors, but rather do so as a consolidated entity.

Q. ARE THERE OTHER REASONS WHY A SIZE ADJUSTMENT IS IMPROPER?

A. Yes. There are other compelling reasons why a small size adjustment is not proper for regulated utilities. Mr. D'Ascendis' proposed size adjustment is based upon his reference to the Duff & Phelps (formerly Morningstar/Ibbotson) studies. However, the small size adjustment in the Duff & Phelps studies is based on the analysis of all stocks, the majority of which are unregulated and include industries that are much riskier than

utilities. While it may or may not be true that, on an overall market basis, smaller publicly-traded firms exhibit more risk than larger firms, these smaller companies' stocks tend to be engaged in riskier businesses as a whole than do larger businesses. Such is not the case for regulated utilities.

Indeed, an academic study conducted by Professor Annie Wong found that:

> **Utility and industrial stocks do not share the same characteristics**. First, given firm size, utility stocks are consistently less risky than industrial stocks. Second, industrial betas tend to decrease with firm size but utility betas do not. These findings may be attributed to the fact that all public utilities operate in an environment with regional monopolistic power than regulated financial structure. As a result, the business and financial risks are very similar among the utilities regardless of their sizes. Therefore, utility betas would not necessarily be expected to be related to firm size.
> . . .
> This implies that although the price phenomenon has been strongly documented for the industrials, the **findings suggest that there is no need to adjust for the firm size in utility rate regulation**.[33] [emphasis added]

Q. CAN YOU PROVIDE ANY EVIDENCE THAT "SIZE" OR "BUSINESS RISK" ADJUSTMENTS ARE NOT GENERALLY RECOGNIZED AS RISK FACTORS IN REGULATORY PROCEEDINGS SUCH AS THIS ONE?

A. Yes, I can. Schedule 12 of Exhibit DCP-2 shows that there is no apparent relationship between size and risk indicators among the proxy water companies.

Q. CAN YOU PROVIDE ANY DIRECT COMPARISONS OF ELECTRIC UTILITIES THAT DEMONSTRATES THAT SMALLER UTILITIES ARE NOT MORE RISKY THAN LARGER ONES?

[33] Wong, Annie, "Utility Stocks and The Size Effect: An Empirical Analysis," Journal of the Midwest Finance Association, 1993, pp. 95-101.

A. Yes. Implicit in Mr. D'Ascendis' proposal is an assumption that any perceived small size risk adjustment for unregulated companies (*i.e.*, source of information cited in Duff & Phelps source Mr. D'Ascendis relies on for small size adjustment) applies to regulated public utilities. Schedule 13 demonstrates objectively that this is not the case. As this schedule shows, there is no significant difference, and even more to the point that there is no discernible pattern of increase, among the risk indicators of publicly-traded electric utilities of different sizes[34]. The table below summarizes the information contained in this schedule:

Cap Size	Safety	Beta	Financial Strength	S&P Rating	Moody's Rating
Under $5 B	2.0	.63	B++/A	BBB+	Baa1
$5 - $15 B	2.0	.67	A	BBB+	Baa1
$15-$25 B	2.1	.58	B++	BBB+	Baa2/Baa1
$25B Plus	1.5	.56	A	BBB+/A-	Baa1

The safety rank, beta values, financial strength and S&P stock ranking are about the same for all sizes of electric utilities. These risk indicators do not reflect any risk differential as the size of the electric utilities decrease from large to small. To the contrary, this data indicates that regulated monopoly utility providers have approximately the same risk regardless of size. As a result, the logic Mr. D'Ascendis uses to justify his proposed small size adjustment is not justified.

Q. WILL YOU UPDATE YOUR TESTIMONY BASED ON INFORMATION THAT BECOMES AVAILABLE?

[34] Electric utilities are used in this comparison since there are more electric utilities for comparative purposes than water utilities.

A. Yes. ORS fully reserves the right to revise its recommendations via supplemental testimony should new information not previously provided by the Company, or other sources, becomes available.

Q. DOES THIS CONCLUDE YOUR PRE-FILED DIRECT TESTIMONY?

A. Yes, it does.

BACKGROUND AND EXPERIENCE PROFILE
DAVID C. PARCELL, MBA, CRRA
PRINCIPAL/SENIOR ECONOMIST

EDUCATION

1985	M.B.A., Virginia Commonwealth University
1970	M.A., Economics, Virginia Polytechnic Institute and State University, (Virginia Tech)
1969	B.A., Economics, Virginia Polytechnic Institute and State University, (Virginia Tech)

POSITIONS

Present	Principal, Technical Associates, Inc.
2007-2016	President, Technical Associates, Inc.
1995-2007	Executive Vice President and Senior Economist, Technical Associates, Inc.
1993-1995	Vice President and Senior Economist, C. W. Amos of Virginia
1972-1993	Vice President and Senior Economist, Technical Associates, Inc.
1969-1972	Research Economist, Technical Associates, Inc.
1968-1969	Research Associate, Department of Economics, Virginia Polytechnic Institute and State University

ACADEMIC HONORS

Omicron Delta Epsilon - Honor Society in Economics
Beta Gamma Sigma - National Scholastic Honor Society of Business Administration
Alpha Iota Delta - National Decision Sciences Honorary Society
Phi Kappa Phi - Scholastic Honor Society

PROFESSIONAL DESIGNATIONS

Certified Rate of Return Analyst - Founding Member

RELEVANT EXPERIENCE

Financial Economics -- Advised and assisted many Virginia banks and savings and loan associations on organizational and regulatory matters. Testified approximately 25 times before the Virginia State Corporation Commission and the Regional Administrator of National Banks on matters related to branching and organization for banks, savings and loan associations, and consumer finance companies. Advised financial institutions on interest rate structure and loan maturity. Testified before Virginia State Corporation Commission on maximum rates for consumer finance companies.

Testified before several committees and subcommittees of Virginia General Assembly on numerous banking matters.

Clients have included First National Bank of Rocky Mount, Patrick Henry National Bank, Peoples Bank of Danville, Blue Ridge Bank, Bank of Essex, and Signet Bank.

Published articles in law reviews and other periodicals on structure and regulation of banking/financial services industry.

Utility Economics -- Performed numerous financial studies of regulated public utilities. Testified in over 575 cases before some fifty state and federal regulatory agencies.

Prepared numerous rate of return studies incorporating cost of equity determination based on DCF, CAPM, comparable earnings and other models. Developed procedures for identifying differential risk characteristics by nuclear construction and other factors.

Conducted studies with respect to cost of service and indexing for determining utility rates, the development of annual review procedures for regulatory control of utilities, fuel and power plant cost recovery adjustment clauses, power supply agreements among affiliates, utility franchise fees, and use of short-term debt in capital structure.

Presented expert testimony before federal regulatory agencies Federal Energy Regulatory Commission, Federal Power Commission, and National Energy Board (Canada), state regulatory agencies in Alabama, Alaska, Arizona, Arkansas, California, Connecticut, Delaware, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Maine, Maryland, Mississippi, Missouri, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, Ontario (Canada), Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, West Virginia, Washington, Wisconsin, U.S. Virgin Islands, and Yukon Territory (Canada).

Published articles in law reviews and other periodicals on the theory and purpose of regulation and other regulatory subjects.

Clients served include state regulatory agencies in Alaska, Arizona, Delaware, Georgia, Mississippi, Missouri, New Hampshire, North Carolina, Ontario (Canada), South Carolina, U.S. Virgin Islands, Virginia and Washington; consumer advocates and attorneys general in Alabama, Alaska, Arizona, District of Columbia, Florida, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Maryland, Nevada, New Jersey, New Mexico, Ohio, Oklahoma, Pennsylvania, South Carolina, Texas, Utah, Vermont, Virginia, and West Virginia; federal agencies including Defense Communications Agency, the Department of Energy, Department of the Navy, and General Services Administration; and various organizations such as Bath Iron Works, Illinois Citizens' Utility Board, Illinois Governor's Office of Consumer Services, Illinois Small Business Utility Advocate, Wisconsin's Environmental Decade, Wisconsin's Citizens Utility Board, Old Dominion Electric Cooperative, and industrial customers.

Insurance Economics -- Conducted analyses of the relationship between the investment income earned by insurance companies on their portfolios and the premiums charged for insurance. Analyzed impact of diversification on financial strength of Blue Cross/Blue Shield Plans in Virginia.

Conducted studies of profitability and cost of capital for property/casualty insurance industry. Evaluated risk of and required return on surplus for various lines of insurance business.

Presented expert testimony before Virginia State Corporation Commission concerning cost of capital and expected gains from investment portfolio. Testified before insurance bureaus of Maine, Massachusetts, New Jersey, North Carolina, Rhode Island, South Carolina and Vermont concerning cost of equity for insurance companies.

Prepared cost of capital and investment income return analyses for numerous insurance companies concerning several lines of insurance business. Analyses used by Virginia Bureau of Insurance for purposes of setting rates.

Special Studies -- Conducted analyses which evaluated the financial and economic implications of legislative and administrative changes. Subject matter of analyses include returnable bottles, retail beer sales, wine sales regulations, taxi-cab taxation, and bank regulation. Testified before several Virginia General Assembly subcommittees.

Testified before Virginia ABC Commission concerning economic impact of mixed beverage license.
Clients include Virginia Beer Wholesalers, Wine Institute, Virginia Retail Merchants Association, and Virginia Taxicab Association.

Franchise, Merger & Anti-Trust Economics -- Conducted studies on competitive impact on market structures due to joint ventures, mergers, franchising and other business restructuring. Analyzed the costs and benefits to parties involved in mergers. Testified in federal courts and before banking and other regulatory bodies concerning the structure and performance of markets, as well as on the impact of restrictive practices.

Clients served include Dominion Bankshares, asphalt contractors, and law firms.

Transportation Economics -- Conducted cost of capital studies to assess profitability of oil pipelines, trucks, taxicabs and railroads. Analyses have been presented before the Federal Energy Regulatory Commission and Alaska Pipeline Commission in rate proceedings. Served as a consultant to the Rail Services Planning Office on the reorganization of rail services in the U.S.

Economic Loss Analyses -- Testified in federal courts, state courts, and other adjudicative forums regarding the economic loss sustained through personal and business injury whether due to bodily harm, discrimination, non-performance, or anticompetitive practices. Testified on economic loss to a commercial bank resulting from publication of adverse information concerning solvency.

Testimony has been presented on behalf of private individuals and business firms.

MEMBERSHIPS

American Economic Association
Virginia Association of Economists
Richmond Society of Financial Analysts
Financial Analysts Federation
Society of Utility and Regulatory Financial Analysts

Board of Directors	1992-2000
Secretary/Treasurer	1994-1998
President	1998-2000

RESEARCH ACTIVITY

Books and Major Research Reports

"Stock Price As An Indicator of Performance," Master of Arts Thesis, Virginia Tech, 1970

"Revision of the Property and Casualty Insurance Ratemaking Process Under Prior Approval in the Commonwealth of Virginia," prepared for the Bureau of Insurance of the Virginia State Corporation Commission, with Charles Schotta and Michael J. Ileo, 1971

"An analysis of the Virginia Consumer Finance Industry to Determine the Need for Restructuring the Rate and Size Ceilings on Small Loans in Virginia and the Process by which They are Governed," prepared for the Virginia Consumer Finance Association, with Michael J. Ileo, 1973

State Banks and the State Corporation Commission: A Historical Review, Technical Associates, Inc., 1974

"A Study of the Implications of the Sale of Wine by the Virginia Department of Alcoholic Beverage Control", prepared for the Virginia Wine Wholesalers Association, Virginia Retail Merchants Association, Virginia Food Dealers Association, Virginia Association of Chain Drugstores, Southland Corporation, and the Wine Institute, 1983.

"Performance and Diversification of the Blue Cross/Blue Shield Plans in Virginia: An Operational Review", prepared for the Bureau of Insurance of the Virginia State Corporation Commission, with Michael J. Ileo and Alexander F. Skirpan, 1988.

The Cost of Capital - A Practitioners' Guide, Society of Utility and Regulatory Financial Analysts, 2010 (previous editions in 1991, 1992, 1993, 1994, 1995 and 1997).

Papers Presented and Articles Published

"The Differential Effect of Bank Structure on the Transmission of Open Market Operations," Western Economic Association Meeting, with Charles Schotta, 1971

"The Economic Objectives of Regulation: The Trend in Virginia," (with Michael J. Ileo), William and Mary Law Review, Vol. 14, No. 2, 1973

"Evolution of the Virginia Banking Structure, 1962-1974: The Effects of the Buck-Holland Bill", (with Michael J. Ileo), William and Mary Law Review, Vol. 16, No. 3, 1975

"Banking Structure and Statewide Branching: The Potential for Virginia", William and Mary Law Review, Vol. 18, No. 1, 1976

"Bank Expansion and Electronic Banking: Virginia Banking Structure Changes Past, Present, and Future," William and Mary Business Review," Vol. 1, No. 2, 1976

"Electronic Banking - Wave of the Future?" (with James R. Marchand), Journal of Management and Business Consulting, Vol. 1, No. 1, 1976

"The Pricing of Electricity" (with James R. Marchand), Journal of Management and Business Consulting, Vol. 1, No. 2, 1976

"The Public Interest - Bank and Savings and Loan Expansion in Virginia" (with Richard D. Rogers), University of Richmond Law Review, Vol. 11, No. 3, 1977

"When Is It In the 'Public Interest' to Authorize a New Bank?", University of Richmond Law Review, Vol. 13, No. 3, 1979

"Banking Deregulation and Its Implications on the Virginia Banking Structure," William and Mary Business Review, Vol. 5, No. 1, 1983

"The Impact of Reciprocal Interstate Banking Statutes on The Performance of Virginia Bank Stocks", with William B. Harrison, Virginia Social Science Journal, Vol. 23, 1988

"The Financial Performance of New Banks in Virginia", Virginia Social Science Journal, Vol. 24, 1989

"Identifying and Managing Community Bank Performance After Deregulation", with William B. Harrison, Journal of Managerial Issues, Vol. II, No. 2, Summer 1990

"The Flotation Cost Adjustment To Utility Cost of Common Equity - Theory, Measurement and Implementation," presented at Twenty-Fifth Financial Forum, National Society of Rate of Return Analysts, Philadelphia, Pennsylvania, April 28, 1993.

Biography of Myon Edison Bristow, Dictionary of Virginia Biography, Volume 2, 2001.

BLUE GRANITE WATER COMPANY
TOTAL COST OF CAPITAL
AS OF JUNE 30, 2019

Capital Item	Percent 1/	Cost Rate		Weighted Cost		
Long-Term Debt	47.09%	5.73% 1/		2.70%		
Common Equity	52.91%	8.90%	**9.45%** 10.00%	4.71%	5.00%	5.29%
Total Capital	100.00%			7.41%	**7.70%** **(with 9.45% ROE)**	7.99%

1/ Capital Structure ratios and cost of debt proposed by Blue Granite, reflecting the test year period figures for Corix Regulated Utilities.

ECONOMIC INDICATORS

Period	Real GDP * Growth	Industrial Production Growth	Unemploy-ment Rate	Consumer Price Index
		1975 - 1982 Cycle		
1975	-0.2%	-8.9%	8.5%	7.0%
1976	5.4%	7.9%	7.7%	4.8%
1977	4.6%	7.6%	7.1%	6.8%
1978	5.6%	5.5%	6.1%	9.0%
1979	3.2%	3.0%	5.8%	13.3%
1980	-0.2%	-2.6%	7.1%	12.4%
1981	2.6%	1.3%	7.6%	8.9%
1982	-1.9%	-5.2%	9.7%	3.8%
		1983 - 1991 Cycle		
1983	4.6%	2.7%	9.6%	3.8%
1984	7.3%	8.9%	7.5%	3.9%
1985	4.2%	1.2%	7.2%	3.8%
1986	3.5%	1.0%	7.0%	1.1%
1987	3.5%	5.2%	6.2%	4.4%
1988	4.2%	5.2%	5.5%	4.4%
1989	3.7%	0.9%	5.3%	4.6%
1990	1.9%	1.0%	5.6%	6.1%
1991	-0.1%	-1.5%	6.8%	3.1%
		1992 - 2001 Cycle		
1992	3.6%	2.9%	7.5%	2.9%
1993	2.7%	3.3%	6.9%	2.7%
1994	4.0%	5.2%	6.1%	2.7%
1995	2.7%	4.7%	5.6%	2.5%
1996	3.8%	4.5%	5.4%	3.3%
1997	4.5%	7.2%	4.9%	1.7%
1998	4.5%	5.8%	4.5%	1.6%
1999	4.7%	4.4%	4.2%	2.7%
2000	4.1%	3.9%	4.0%	3.4%
2001	1.0%	-3.1%	4.7%	1.6%
		2002 - 2009		
2002	1.8%	0.3%	5.8%	2.4%
2003	2.8%	1.2%	6.0%	1.9%
2004	3.8%	2.6%	5.5%	3.3%
2005	3.3%	3.3%	5.1%	3.4%
2006	2.7%	2.2%	4.6%	2.5%
2007	1.8%	2.5%	4.6%	4.1%
2008	-0.1%	-3.5%	5.8%	0.1%
2009	-2.5%	-11.5%	9.3%	2.7%
		Current Cycle		
2010	2.6%	5.5%	9.6%	1.5%
2011	1.6%	3.1%	8.9%	3.0%
2012	2.2%	3.0%	8.1%	1.7%
2013	1.8%	2.0%	7.4%	1.5%
2014	2.5%	3.1%	6.2%	0.8%
2015	2.9%	-1.0%	5.3%	0.7%
2016	1.6%	-1.9%	4.9%	2.1%
2017	2.4%	1.6%	4.4%	2.1%
2018	2.9%	3.9%	3.9%	1.9%
2019			3.7%	2.3%
1Q	3.1%	2.9%	3.9%	2.4%
2Q	2.0%	1.2%	3.6%	2.0%
3Q	2.1%	1.1%	3.6%	1.6%
4Q			3.5%	3.6%

* GDP = Gross Domestic Product.

Note that certain series of data are periodically revised.

Sources: Council of Economic Advisors, Economic Indiators, various issues, certain earlier year data from sources used by this publication.

INTEREST RATES

Period	Prime Rate	U.S. Treasury T Bills 3 Months	U.S. Treasury T Bonds 10 Year	Utility Bonds Aa	Utility Bonds A	Utility Bonds Baa
			1975 - 1982 Cycle			
1975	7.86%	5.84%	7.99%	9.44%	10.09%	10.96%
1976	6.84%	4.99%	7.61%	8.92%	9.29%	9.82%
1977	6.83%	5.27%	7.42%	8.43%	8.61%	9.06%
1978	9.06%	7.22%	8.41%	9.10%	9.29%	9.62%
1979	12.67%	10.04%	9.44%	10.22%	10.49%	10.96%
1980	15.27%	11.51%	11.46%	13.00%	13.34%	13.95%
1981	18.89%	14.03%	13.93%	15.30%	15.95%	16.60%
1982	14.86%	10.69%	13.00%	14.79%	15.86%	16.45%
			1983 - 1991 Cycle			
1983	10.79%	8.63%	11.10%	12.83%	13.66%	14.20%
1984	12.04%	9.58%	12.44%	13.66%	14.03%	14.53%
1985	9.93%	7.48%	10.62%	12.06%	12.47%	12.96%
1986	8.33%	5.98%	7.68%	9.30%	9.58%	10.00%
1987	8.21%	5.82%	8.39%	9.77%	10.10%	10.53%
1988	9.32%	6.69%	8.85%	10.26%	10.49%	11.00%
1989	10.87%	8.12%	8.49%	9.56%	9.77%	9.97%
1990	10.01%	7.51%	8.55%	9.65%	9.86%	10.06%
1991	8.46%	5.42%	7.86%	9.09%	9.36%	9.55%
			1992 - 2001 Cycle			
1992	6.25%	3.45%	7.01%	8.55%	8.69%	8.86%
1993	6.00%	3.02%	5.87%	7.44%	7.59%	7.91%
1994	7.15%	4.29%	7.09%	8.21%	8.31%	8.63%
1995	8.83%	5.51%	6.57%	7.77%	7.89%	8.29%
1996	8.27%	5.02%	6.44%	7.57%	7.75%	8.16%
1997	8.44%	5.07%	6.35%	7.54%	7.60%	7.95%
1998	8.35%	4.81%	5.26%	6.91%	7.04%	7.26%
1999	8.00%	4.66%	5.65%	7.51%	7.62%	7.88%
2000	9.23%	5.85%	6.03%	8.06%	8.24%	8.36%
2001	6.91%	3.44%	5.02%	7.59%	7.78%	8.02%
			2002 - 2009			
2002	4.67%	1.62%	4.61%	7.19%	7.37%	8.02%
2003	4.12%	1.02%	4.01%	6.40%	6.58%	6.84%
2004	4.34%	1.38%	4.27%	6.04%	6.16%	6.40%
2005	6.19%	3.16%	4.29%	5.44%	5.65%	5.93%
2006	7.96%	4.73%	4.80%	5.84%	6.07%	6.32%
2007	8.05%	4.41%	4.63%	5.94%	6.07%	6.33%
2008	5.09%	1.48%	3.66%	6.18%	6.53%	7.25%
2009	3.25%	0.16%	3.26%	5.75%	6.04%	7.06%
			Current Cycle			
2010	3.25%	0.14%	3.22%	5.24%	5.46%	5.96%
2011	3.25%	0.06%	2.78%	4.78%	5.04%	5.57%
2012	3.25%	0.09%	1.80%	3.83%	4.13%	4.86%
2013	3.25%	0.06%	2.35%	4.24%	4.47%	4.98%
2014	3.25%	0.03%	2.54%	4.19%	4.28%	4.80%
2015	3.26%	0.06%	2.14%	4.00%	4.12%	5.03%
2016	3.51%	0.33%	1.84%	3.73%	3.93%	4.69%
2017	4.10%	0.94%	2.33%	3.82%	4.00%	4.38%
2018	4.91%	1.94%	2.91%	4.09%	4.25%	4.67%
2019	5.58%	2.08%	2.14%	3.61%	3.77%	4.19%
Jan	5.50%	2.41%	2.71%	4.18%	4.35%	4.91%
Feb	5.50%	2.40%	2.68%	4.05%	4.25%	4.76%
Mar	5.50%	2.41%	2.57%	3.98%	4.16%	4.65%
Apr	5.50%	2.38%	2.53%	3.91%	4.08%	4.55%
May	5.50%	2.35%	2.40%	3.84%	3.98%	4.47%
June	5.50%	2.20%	2.07%	3.65%	3.82%	4.31%
July	5.50%	2.13%	2.06%	3.53%	3.69%	4.13%
Aug	5.25%	1.97%	1.63%	3.17%	3.29%	3.63%
Sep	5.00%	1.93%	1.70%	3.24%	3.37%	3.71%
Oct	4.75%	1.68%	1.71%	3.24%	3.39%	3.72%
Nov	4.75%	1.55%	1.81%	3.25%	3.43%	3.76%
Dec	4.75%	1.54%	1.86%	3.22%	3.40%	3.73%

Sources: Council of Economic Advisors, Economic Indiators, various issues, Mergent Bond Record.

STOCK PRICE INDICATORS

Period	S&P Composite	NASDAQ Composite	Dow Jones Industrials	S&P E/P
		1975 - 1982 Cycle		
1975			802.49	9.15%
1976			974.92	8.90%
1977			894.63	10.79%
1978			820.23	12.03%
1979			844.40	13.46%
1980			891.41	12.86%
1981			932.92	11.96%
1982			844.36	11.60%
		1983 - 1991 Cycle		
1983			1,190.34	8.03%
1984			1,178.48	10.02%
1985			1,328.23	8.12%
1986			1,792.76	6.09%
1987			2,275.99	5.48%
1988	265.79		2,060.82	8.01%
1989	322.84		2,508.91	7.42%
1990	334.59		2,678.94	6.47%
1991	376.18	491.69	2,929.33	4.79%
		1992 - 2001 Cycle		
1992	415.74	599.26	3,284.29	4.22%
1993	451.41	715.16	3,522.06	4.46%
1994	460.33	751.65	3,793.77	5.83%
1995	541.64	925.19	4,493.76	6.09%
1996	670.83	1,164.96	5,742.89	5.24%
1997	872.72	1,469.49	7,441.15	4.57%
1998	1,085.50	1,794.91	8,625.52	3.46%
1999	1,327.33	2,728.15	10,464.88	3.17%
2000	1,427.22	2,783.67	10,734.90	3.63%
2001	1,194.18	2,035.00	10,189.13	2.95%
		2002 - 2009		
2002	993.94	1,539.73	9,226.43	2.92%
2003	965.23	1,647.17	8,993.59	3.84%
2004	1,130.65	1,986.53	10,317.39	4.89%
2005	1,207.23	2,099.32	10,547.67	5.36%
2006	1,310.46	2,263.41	11,408.67	5.78%
2007	1,476.66	2,577.12	13,169.98	5.29%
2008	1,220.89	2,162.46	11,252.61	3.54%
2009	946.73	1,841.03	8,876.15	1.86%
		Current Cycle		
2010	1,139.31	2,347.70	10,662.80	6.04%
2011	1,268.89	2,680.42	11,966.36	6.77%
2012	1,379.56	2,965.77	12,967.08	6.20%
2013	1,462.51	3,537.69	14,999.67	5.57%
2014	1,930.67	4,374.31	16,773.99	5.25%
2015	2,061.20	4,943.49	17,590.61	4.59%
2016	2,092.39	4,982.49	17,908.08	4.17%
2017	2,448.22	6,231.28	21,741.91	4.22%
2018	2,744.68	7,419.27	25,045.75	4.66%
2019	2,912.50	7,936.50	26,378.41	

Note: this source did not publish the S&P Composite prior to 1989 and the NASDAQ prior to 1991.

Sources: Council of Economic Advisors, Economic Indiators, various issues.

UTILITIES, INC. 1/
CAPITAL STRUCTURE RATIOS
2014 -2018

Year	Common Equity	Long-Term Debt	Short-Term Debt
2014	$187,441,949	$180,000,000	
	51.0%	49.0%	0.0%
	51.0%	49.0%	
2015	$201,933,346	$180,000,000	
	52.9%	47.1%	0.0%
	52.9%	47.1%	
2016	$212,229,668	$189,670,635	
	52.8%	47.2%	0.0%
	52.8%	47.2%	
2017	$246,763,069	$171,463,069	
	59.0%	41.0%	0.0%
	59.0%	41.0%	
2018	$263,701,642	$251,742,026	
	51.2%	48.8%	0.0%
	51.2%	48.8%	
June 30, 2019	$282,859,007	$251,780,649	$0
	52.9%	47.1%	0.0%
	52.9%	47.1%	

1/ Subsequent to the end of 2018, Utilities, Inc. was renamed Corix Regulated Utilities Inc.

Sources: Response to ORS Data Request # AIR 1.59, information containted in Company filing.

PROXY COMPANIES
CAPITAL STRUCTURE RATIOS

	2014	2015	2016	2017	2018	2014-2018 Average	2022-2024 Estimated
Value Line Water Group							
American States Water Co.	60.9%	58.9%	60.6%	62.0%	59.5%	60.4%	54.0%
American Water Works Co.	47.4%	46.2%	47.5%	45.3%	43.6%	46.0%	41.0%
Aqua America, Inc.	51.5%	49.7%	51.6%	49.4%	45.6%	49.6%	47.0%
Artesian Resources	54.5%	56.1%	57.6%	58.1%	56.9%	56.6%	
California Water Service Group	59.9%	55.6%	55.4%	57.3%	50.7%	55.8%	60.5%
Middlesex Water Co.	58.8%	59.8%	61.5%	61.8%	61.6%	60.7%	60.5%
SJW Group	48.4%	50.2%	49.3%	51.8%	67.3%	53.4%	67.5%
York Water Co.	55.2%	55.6%	57.4%	57.0%	57.5%	56.5%	66.0%
Average						**54.9%**	**56.6%**
Median						**56.2%**	**60.5%**
Parcell Proxy Group							
American States Water Co.	60.9%	58.9%	60.6%	62.0%	59.5%	60.4%	54.0%
American Water Works Co.	47.4%	46.2%	47.5%	45.3%	43.6%	46.0%	41.0%
California Water Service Group	59.9%	55.6%	55.4%	57.3%	50.7%	55.8%	60.5%
Middlesex Water Co.	58.8%	59.8%	61.5%	61.8%	61.6%	60.7%	60.5%
York Water Co.	55.2%	55.6%	57.4%	57.0%	57.5%	56.5%	66.0%
Average						**55.9%**	**56.4%**
Median						**56.5%**	**60.5%**
D'Ascendis Water Group							
American States Water Co.	60.9%	58.9%	60.6%	62.0%	59.5%	60.4%	54.0%
American Water Works Co.	47.4%	46.2%	47.5%	45.3%	43.6%	46.0%	41.0%
Artesian Resources	54.5%	56.1%	57.6%	58.1%	56.9%	56.6%	
California Water Service Group	59.9%	55.6%	55.4%	57.3%	50.7%	55.8%	60.5%
Middlesex Water Co.	58.8%	59.8%	61.5%	61.8%	61.6%	60.7%	60.5%
York Water Co.	55.2%	55.6%	57.4%	57.0%	57.5%	56.5%	66.0%
Mean						**56.0%**	**56.4%**
Median						**56.6%**	**60.5%**

Source: Value Line Investment Survey (January 10, 2020).

PROXY COMPANIES
CRITERIA FOR SELECTION

Company	Market Capitalization ($000)	Common Equity Ratio	Value Line Safety	S&P Bond Rating 6/	Moody's Bond Rating 6/	Proxy Group Inclusion?
Value Line Water Group 1/						
American States Water Co.	$3,200,000	56.0%	2	A+	NR	Yes
American Water Works Co.	$22,200,000	42.0%	3	A	Baa1	Yes
Aqua America, Inc.	$10,200,000	57.5%	2	A	Baa2	No 2/
Artesian Resources	$343,360	56.9%	3	NR	NR	No 3/
California Water Service Group	$2,500,000	49.0%	3	A+	NR	Yes
Consolidated Water Co.	$250,000	100.0%	3	NR	NR	No 5/
Middlesex Water Co.	$1,100,000	54.5%	2	A	NR	Yes
SJW Group	$2,000,000	63.5%	3	A-	NR	No 4/
York Water Co.	$600,000	60.0%	3	A-	NR	Yes
Parcell Proxy Group						
American States Water Co.	$3,200,000	56.0%	2	A+	NR	
American Water Works Co.	$22,200,000	42.0%	3	A	Baa1	
California Water Service Group	$2,500,000	49.0%	3	A+	NR	
Middlesex Water Co.	$1,100,000	54.5%	2	A	NR	
York Water Co.	$600,000	60.0%	3	A-	NR	
D'Ascendis Water Group						
American States Water Co.	$3,200,000	56.0%	2	A+	NR	
American Water Works Co.	$22,200,000	42.0%	3	A	Baa1	
Artesian Resources	$343,360	56.9%	3	NR	NR	
California Water Service Group	$2,500,000	49.0%	3	A+	NR	
Middlesex Water Co.	$1,100,000	54.5%	2	A	NR	
York Water Co.	$600,000	60.0%	3	A-	NR	

1/ Companies considered are reported in Value Line, Standard Edition, and are listed as "Water Utility Industry," except for Artesian Resources, which is reported in the Value Line, Small and Mid-Cap Edition.

2/ Aqua America not included in Parcell proxy group since this firm is currently involved in merger of Peoples Natural Gas Co., Peoples Gas, and Delta Natural Gas.

3/ Artesian Resources not included in Parcell proxy group since this company is not listed in Value Line Standard Edition, no Value Line projections.

4/ Connecticut Water and SJW not included in Parcell proxy group since these two firms merged on October 9, 2019, with SJW being the surviving company.

5/ Consolidated Water not included in Parcell proxy group since this Company operates primarily as a desalination provider of water in areas outside the U.S.

6/ Bond ratings are for Issuer Rating (Moody's) and Issuer Credit (Standard & Poor's) for companies that have these ratings, and highest other ratings for companies that do not have these ratings.

Sources: Value Line (January 10, 2020), S&P and Moody's websites, assessed January 6, 2020.

PROXY COMPANIES
DIVIDEND YIELD CALCULATIONS

Company	Quarterly DPS	Annual DPS	Stock Price (October - December 2019) High	Low	Average	Yield
Value Line Water Group						
American States Water Co.	$0.305	$1.22	$96.00	$82.54	$89.27	1.37%
American Water Works Co.	$0.500	$2.00	$125.96	$114.96	$120.46	1.66%
Aqua America, Inc.	$0.234	$0.94	$47.33	$42.98	$45.16	2.07%
Artesian Resources	$0.250	$1.00	$37.84	$35.88	$36.86	2.71%
California Water Service Group	$0.198	$0.79	$56.49	$48.78	$52.64	1.50%
Middlesex Water Co.	$0.256	$1.02	$67.69	$58.75	$63.22	1.62%
SJW Group	$0.300	$1.20	$74.47	$66.39	$70.43	1.70%
York Water Co.	$0.180	$0.72	$47.27	$41.11	$44.19	1.63%
Mean						**1.78%**
Parcell Proxy Group						
American States Water Co.	$0.305	$1.22	$96.00	$82.54	$89.27	1.37%
American Water Works Co.	$0.500	$2.00	$125.96	$114.96	$120.46	1.66%
California Water Service Group	$0.198	$0.79	$56.49	$48.78	$52.64	1.50%
Middlesex Water Co.	$0.256	$1.02	$67.69	$58.75	$63.22	1.62%
York Water Co.	$0.180	$0.72	$47.27	$41.11	$44.19	1.63%
Mean						**1.56%**
D'Ascendis Water Group						
American States Water Co.	$0.305	$1.22	$96.00	$82.54	$89.27	1.37%
American Water Works Co.	$0.500	$2.00	$125.96	$114.96	$120.46	1.66%
Artesian Resources	$0.250	$1.00	$37.84	$35.88	$36.86	2.71%
California Water Service Group	$0.198	$0.79	$56.49	$48.78	$52.64	1.50%
Middlesex Water Co.	$0.256	$1.02	$67.69	$58.75	$63.22	1.62%
York Water Co.	$0.180	$0.72	$47.27	$41.11	$44.19	1.63%
Mean						**1.75%**

Source: Information contained in Yahoo Finance (Accessed January 4, 2020).

PROXY COMPANIES
RETENTION GROWTH RATES

Company	2014	2015	2016	2017	2018	2014-18 Average	2019	2020	2016-18 to 2022-24	2019 - 2022-24 Average
Value Line Water Group										
American States Water Co.	5.7%	6.0%	5.3%	6.2%	4.5%	5.5%	6.0%	6.0%	5.5%	5.8%
American Water Works Co.	4.3%	4.7%	4.0%	2.5%	4.2%	3.9%	5.0%	5.0%	5.0%	5.0%
Aqua America, Inc.	6.1%	4.7%	5.6%	5.1%	2.1%	4.7%	4.0%	3.0%	4.0%	3.7%
Artesian Resources	1.6%	2.6%	3.4%	3.7%	3.6%	3.0%				
California Water Service Group	4.1%	2.0%	2.4%	4.7%	4.0%	3.4%	4.0%	5.5%	6.0%	5.2%
Middlesex Water Co.	3.1%	3.5%	4.3%	3.8%	7.0%	4.3%	6.0%	6.5%	7.5%	6.7%
SJW Group	10.2%	5.7%	8.6%	8.2%	1.8%	6.9%	1.0%	3.5%	5.5%	3.3%
York Water Co.	3.9%	4.4%	3.4%	4.0%	3.8%	3.9%	4.5%	4.0%	6.0%	4.8%
Mean						**4.5%**				**4.9%**
Parcell Proxy Group										
American States Water Co.	5.7%	6.0%	5.3%	6.2%	4.5%	5.5%	6.0%	6.0%	5.5%	5.8%
American Water Works Co.	4.3%	4.7%	4.0%	2.5%	4.2%	3.9%	5.0%	5.0%	5.0%	5.0%
California Water Service Group	4.1%	2.0%	2.4%	4.7%	4.0%	3.4%	4.0%	5.5%	6.0%	5.2%
Middlesex Water Co.	3.1%	3.5%	4.3%	3.8%	7.0%	4.3%	6.0%	6.5%	7.5%	6.7%
York Water Co.	3.9%	4.4%	3.4%	4.0%	3.8%	3.9%	4.5%	4.0%	6.0%	4.8%
Mean						**4.2%**				**5.5%**
D'Ascendis Water Group										
American States Water Co.	5.7%	6.0%	5.3%	6.2%	4.5%	5.5%	6.0%	6.0%	5.5%	5.8%
American Water Works Co.	4.3%	4.7%	4.0%	2.5%	4.2%	3.9%	5.0%	5.0%	5.0%	5.0%
Artesian Resources	1.6%	2.6%	3.4%	3.7%	3.6%	3.0%				
California Water Service Group	4.1%	2.0%	2.4%	4.7%	4.0%	3.4%	4.0%	5.5%	6.0%	5.2%
Middlesex Water Co.	3.1%	3.5%	4.3%	3.8%	7.0%	4.3%	6.0%	6.5%	7.5%	6.7%
York Water Co.	3.9%	4.4%	3.4%	4.0%	3.8%	3.9%	4.5%	4.0%	6.0%	4.8%
Mean						**4.0%**				**5.5%**

Figures reported by Value Line as "Retained to Com Eq."

Source: Value Line Investment Survey (January 10, 2020).

PROXY COMPANIES
PER SHARE GROWTH RATES

Company	Five-Year Historic Growth Rates				Est'd -16-'18 to '22-'24 Growth Rates			
	EPS	DPS	BVPS	Average	EPS	DPS	BVPS	Average
Value Line Water Group								
American States Water Co.	4.5%	9.0%	4.0%	5.8%	8.0%	9.5%	5.0%	7.5%
American Water Works Co.	6.5%	10.5%	4.0%	7.0%	9.5%	9.0%	5.0%	7.8%
Aqua America, Inc.	5.5%	8.0%	6.5%	6.7%	8.0%	8.0%	9.0%	8.3%
Artesian Resources	9.0%	3.0%	3.5%	5.2%				
California Water Service Group	5.5%	3.0%	4.5%	4.3%	8.0%	6.5%	2.0%	5.5%
Middlesex Water Co.	11.0%	3.0%	4.5%	6.2%	7.5%	5.0%	3.0%	5.2%
SJW Group	18.5%	5.0%	8.0%	10.5%	7.0%	7.0%	7.5%	7.2%
York Water Co.	6.5%	4.0%	4.0%	4.8%	9.5%	6.5%	4.5%	6.8%
Mean				**6.3%**				**6.9%**
Parcell Proxy Group								
American States Water Co.	4.5%	9.0%	4.0%	5.8%	8.0%	9.5%	5.0%	7.5%
American Water Works Co.	6.5%	10.5%	4.0%	7.0%	9.5%	9.0%	5.0%	7.8%
California Water Service Group	5.5%	3.0%	4.5%	4.3%	8.0%	6.5%	2.0%	5.5%
Middlesex Water Co.	11.0%	3.0%	4.5%	6.2%	7.5%	5.0%	3.0%	5.2%
York Water Co.	6.5%	4.0%	4.0%	4.8%	9.5%	6.5%	4.5%	6.8%
Mean				**5.6%**				**6.6%**
D'Ascendis Water Group								
American States Water Co.	4.5%	9.0%	4.0%	5.8%	8.0%	9.5%	5.0%	7.5%
American Water Works Co.	6.5%	10.5%	4.0%	7.0%	9.5%	9.0%	5.0%	7.8%
Artesian Resources	9.0%	3.0%	3.5%	5.2%				
California Water Service Group	5.5%	3.0%	4.5%	4.3%	8.0%	6.5%	2.0%	5.5%
Middlesex Water Co.	11.0%	3.0%	4.5%	6.2%	7.5%	5.0%	3.0%	5.2%
York Water Co.	6.5%	4.0%	4.0%	4.8%	9.5%	6.5%	4.5%	6.8%
Mean				**5.6%**				**6.6%**

Source: Value Line Investment Survey (January 10, 2020).

PROXY COMPANIES
DCF COST RATES

Company	Adjusted Yield	Historic Retention Growth	Prospective Retention Growth	Historic Per Share Growth	Prospective Per Share Growth	First Call EPS Growth	Average Growth	DCF Rates
Value Line Water Group								
American States Water Co.	1.4%	5.5%	5.8%	5.8%	7.5%	6.00%	6.1%	7.5%
American Water Works Co.	1.7%	3.9%	5.0%	7.0%	7.8%	8.20%	6.4%	8.1%
Aqua America, Inc.	2.1%	4.7%	3.7%	6.7%	8.3%	6.10%	5.9%	8.0%
Artesian Resources	2.8%	3.0%		5.2%		4.00%	4.0%	6.8%
California Water Service Group	1.5%	3.4%	5.2%	4.3%	5.5%	9.80%	5.6%	7.2%
Middlesex Water Co.	1.7%	4.3%	6.7%	6.2%	5.2%	2.70%	5.0%	6.7%
SJW Group	1.8%	6.9%	3.3%	10.5%	7.2%	14.00%	8.4%	10.2%
York Water Co.	1.7%	3.9%	4.8%	4.8%	6.8%	4.90%	5.1%	6.7%
Mean	1.8%	4.5%	4.9%	6.3%	6.9%	7.0%	5.8%	**7.7%**
Median	1.7%	4.1%	5.0%	6.0%	7.2%	6.1%	5.8%	**7.4%**
Composite - Mean		**6.3%**	6.8%	8.1%	8.7%	**8.8%**	7.7%	
Composite - Median		**5.8%**	6.7%	7.7%	**8.9%**	7.7%	7.5%	
Parcell Proxy Group								
American States Water Co.	1.4%	5.5%	5.8%	5.8%	7.5%	6.00%	6.1%	7.5%
American Water Works Co.	1.7%	3.9%	5.0%	7.0%	7.8%	8.20%	6.4%	8.1%
California Water Service Group	1.5%	3.4%	5.2%	4.3%	5.5%	9.80%	5.6%	7.2%
Middlesex Water Co.	1.7%	4.3%	6.7%	6.2%	5.2%	2.70%	5.0%	6.7%
York Water Co.	1.7%	3.9%	4.8%	4.8%	6.8%	4.90%	5.1%	6.7%
Mean	1.6%	4.2%	5.5%	5.6%	6.6%	6.3%	5.7%	**7.3%**
Median	1.7%	3.9%	5.2%	5.8%	6.8%	6.0%	5.6%	**7.2%**
Composite - Mean		**5.8%**	7.1%	7.2%	**8.2%**	7.9%	7.3%	
Composite - Median		**5.6%**	6.8%	7.5%	**8.5%**	7.7%	7.3%	
D'Ascendis Water Group								
American States Water Co.	1.4%	5.5%	5.8%	5.8%	7.5%	6.00%	6.1%	7.5%
American Water Works Co.	1.7%	3.9%	5.0%	7.0%	7.8%	8.20%	6.4%	8.1%
Artesian Resources	2.8%	3.0%		5.2%		4.00%	4.0%	6.8%
California Water Service Group	1.5%	3.4%	5.2%	4.3%	5.5%	9.80%	5.6%	7.2%
Middlesex Water Co.	1.7%	4.3%	6.7%	6.2%	5.2%	2.70%	5.0%	6.7%
York Water Co.	1.7%	3.9%	4.8%	4.8%	6.8%	4.90%	5.1%	6.7%
Mean	1.8%	4.0%	5.5%	5.6%	6.6%	5.9%	5.4%	**7.2%**
Median	1.7%	3.9%	5.2%	5.5%	6.8%	5.5%	5.4%	**7.0%**
Composite - Mean		**5.8%**	7.3%	7.4%	**8.4%**	7.7%	7.2%	
Composite - Median		**5.6%**	6.8%	7.2%	**8.5%**	7.1%	7.0%	

Sources: previous pages of this schedule, Yahoo! Finance (January 4, 2020.)

STANDARD & POOR'S 500 COMPOSITE
20-YEAR U.S. TREASURY BOND YIELDS
RISK PREMIUMS

Year	EPS	BVPS	ROE	20-Year T-Bond Yield	Risk Premium
1977		$79.07			
1978	$12.33	$85.35	15.00%	7.90%	7.10%
1979	$14.86	$94.27	16.55%	8.86%	7.69%
1980	$14.82	$102.48	15.06%	9.97%	5.09%
1981	$15.36	$109.43	14.50%	11.55%	2.95%
1982	$12.64	$112.46	11.39%	13.50%	-2.11%
1983	$14.03	$116.93	12.23%	10.38%	1.85%
1984	$16.64	$122.47	13.90%	11.74%	2.16%
1985	$14.61	$125.20	11.80%	11.25%	0.55%
1986	$14.48	$126.82	11.49%	8.98%	2.51%
1987	$17.50	$134.07	13.42%	7.92%	5.50%
1988	$23.75	$141.32	17.25%	8.97%	8.28%
1989	$22.87	$147.26	15.85%	8.81%	7.04%
1990	$21.73	$153.01	14.47%	8.19%	6.28%
1991	$16.29	$158.85	10.45%	8.22%	2.23%
1992	$18.86	$149.74	12.22%	7.26%	4.96%
1993	$21.89	$180.88	13.24%	7.17%	6.07%
1994	$30.60	$193.06	16.37%	6.59%	9.78%
1995	$33.96	$216.51	16.58%	7.60%	8.98%
1996	$38.73	$237.08	17.08%	6.18%	10.90%
1997	$39.72	$249.52	16.33%	6.64%	9.69%
1998	$37.71	$266.40	14.62%	5.83%	8.79%
1999	$48.17	$290.68	17.29%	5.57%	11.72%
2000	$50.00	$325.80	16.22%	6.50%	9.72%
2001	$24.70	$338.37	7.44%	5.53%	1.91%
2002	$27.59	$321.72	8.36%	5.59%	2.77%
2003	$48.73	$367.17	14.15%	4.80%	9.35%
2004	$58.55	$414.75	14.98%	5.02%	9.96%
2005	$69.93	$453.06	16.12%	4.69%	11.43%
2006	$81.51	$504.39	17.03%	4.68%	12.35%
2007	$66.17	$529.59	12.80%	4.86%	7.94%
2008	$14.88	$451.37	3.03%	4.45%	-1.42%
2009	$50.97	$513.58	10.56%	3.47%	7.09%
2010	$77.35	$579.14	14.16%	4.25%	9.91%
2011	$86.95	$613.14	14.59%	3.82%	10.77%
2012	$86.51	$666.97	13.52%	2.46%	11.06%
2013	$100.20	$715.84	14.49%	2.88%	11.61%
2014	$102.31	$726.96	14.18%	3.41%	10.77%
2015	$88.43	$740.29	12.05%	2.47%	9.58%
2016	$95.48	$768.98	12.65%	2.30%	10.35%
2017	$110.98	$826.52	13.91%	2.67%	11.24%
2018	$134.66	$851.62	16.05%	2.82%	13.23%
Mean					**7.26%**

ROE = EPS divided by average of year-begin and year-end BVPS.

20-Year T-Bond Yield = income return on long-term U.S. Government Bonds.

Sources: Standard & Poor's, Duff & Phelps.

PROXY COMPANIES
CAPM COST RATES

Company	Risk-Free Rate	Beta	Risk Premium	CAPM Rates
Value Line Water Group				
American States Water Co.	2.10%	0.65	5.9%	5.9%
American Water Works Co.	2.10%	0.55	5.9%	5.3%
Aqua America, Inc.	2.10%	0.65	5.9%	5.9%
Artesian Resources	2.10%	0.65	5.9%	5.9%
California Water Service Group	2.10%	0.70	5.9%	6.2%
Middlesex Water Co.	2.10%	0.75	5.9%	6.5%
SJW Group	2.10%	0.60	5.9%	5.6%
York Water Co.	2.10%	0.70	5.9%	6.2%
Mean				**6.0%**
Median				**5.9%**
Parcell Proxy Group				
American States Water Co.	2.10%	0.65	5.9%	5.9%
American Water Works Co.	2.10%	0.55	5.9%	5.3%
California Water Service Group	2.10%	0.70	5.9%	6.2%
Middlesex Water Co.	2.10%	0.75	5.9%	6.5%
York Water Co.	2.10%	0.70	5.9%	6.2%
Mean				**6.0%**
Median				**6.2%**
D'Ascendis Water Group				
American States Water Co.	2.10%	0.65	5.9%	5.9%
American Water Works Co.	2.10%	0.55	5.9%	5.3%
Artesian Resources	2.10%	0.65	5.9%	5.9%
California Water Service Group	2.10%	0.70	5.9%	6.2%
Middlesex Water Co.	2.10%	0.75	5.9%	6.5%
York Water Co.	2.10%	0.70	5.9%	6.2%
Mean				**6.0%**
Median				**6.1%**

Sources: Value Line Investment Survey (January 10, 2020), Standard & Poor's, Federal Reserve.

Yields on 20-Year U.S. Treasury Bonds

Month	Rate
Oct. 2019	2.00%
Nov. 2019	2.13%
Dec. 2019	2.16%
Average	2.10%

PROXY COMPANIES
RATES OF RETURN ON AVERAGE COMMON EQUITY

Company	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2002-08 Average	2009-18 Average	2019	2020	2022-24
Value Line Water Group																						
American States Water Co.	9.8%	5.6%	7.3%	8.6%	8.3%	9.5%	8.8%	8.7%	11.2%	10.7%	12.6%	13.2%	12.1%	12.4%	12.3%	13.4%	11.6%	8.3%	11.8%	13.5%	13.0%	14.0%
American Water Works Co.							4.1%	5.1%	6.6%	7.2%	8.6%	8.0%	8.9%	9.5%	9.1%	8.0%	10.1%		8.1%	10.5%	10.5%	11.5%
Aqua America, Inc.	12.6%	11.9%	11.4%	11.7%	10.6%	10.0%	9.6%	9.7%	10.8%	11.8%	11.5%	14.0%	13.4%	12.0%	13.1%	12.6%	9.7%	11.1%	11.9%	6.0%	8.5%	11.0%
Artesian Resources	9.2%	5.8%	7.3%	8.8%	7.9%	8.3%	7.3%	8.1%	8.1%	6.5%	8.5%	6.9%	7.7%	8.8%	9.5%	9.7%	9.5%	7.8%	8.3%			
California Water Service Group	9.7%	8.9%	9.7%	9.4%	7.9%	8.2%	10.0%	9.9%	8.8%	8.1%	9.3%	8.6%	9.3%	7.1%	7.4%	9.9%	9.2%	9.1%	8.8%	9.0%	11.0%	12.5%
Middlesex Water Co.	10.1%	8.1%	9.3%	8.7%	9.2%	8.9%	8.9%	7.1%	8.9%	7.5%	7.9%	8.8%	9.4%	9.8%	10.6%	10.1%	13.4%	9.0%	9.4%	12.5%	13.0%	14.5%
SJW Group	9.4%	10.4%	9.1%	10.8%	10.3%	8.2%	8.0%	5.9%	6.1%	7.9%	8.2%	7.3%	15..1%	10.1%	13.0%	13.2%	6.8%	9.5%	8.7%	4.5%	7.5%	9.5%
York Water Co.	10.4%	11.8%	11.3%	11.8%	10.9%	9.7%	9.4%	9.8%	10.1%	9.7%	9.5%	9.5%	11.0%	11.6%	10.6%	11.1%	10.9%	10.8%	10.4%	11.0%	10.5%	14.0%
Mean	10.2%	8.9%	9.3%	10.0%	9.3%	9.0%	8.3%	8.0%	8.8%	8.7%	9.5%	9.5%	10.3%	10.2%	10.7%	11.0%	10.2%	**9.4%**	**9.7%**	**9.6%**	**10.6%**	**12.4%**
Median	9.8%	8.9%	9.3%	9.4%	9.2%	8.9%	8.9%	8.4%	8.9%	8.0%	9.0%	8.7%	9.4%	10.0%	10.6%	10.6%	9.9%	**9.2%**	**9.3%**	**10.5%**	**10.5%**	**12.5%**
Parcell Proxy Group																						
American States Water Co.	9.8%	5.6%	7.3%	8.6%	8.3%	9.5%	8.8%	8.7%	11.2%	10.7%	12.6%	13.2%	12.1%	12.4%	12.3%	13.4%	11.6%	8.3%	11.8%	13.5%	13.0%	14.0%
American Water Works Co.							4.1%	5.1%	6.6%	7.2%	8.6%	8.0%	8.9%	9.5%	9.1%	8.0%	10.1%		8.1%	10.5%	10.5%	11.5%
California Water Service Group	9.7%	8.9%	9.7%	9.4%	7.9%	8.2%	10.0%	9.9%	8.8%	8.1%	9.3%	8.6%	9.3%	7.1%	7.4%	9.9%	9.2%	9.1%	8.8%	9.0%	11.0%	12.5%
Middlesex Water Co.	10.1%	8.1%	9.3%	8.7%	9.2%	8.9%	8.9%	7.1%	8.9%	7.5%	7.9%	8.8%	9.4%	9.8%	10.6%	10.1%	13.4%	9.0%	9.4%	12.5%	13.0%	14.5%
York Water Co.	10.4%	11.8%	11.3%	11.8%	10.9%	9.7%	9.4%	9.8%	10.1%	9.7%	9.5%	9.5%	11.0%	11.6%	10.6%	11.1%	10.9%	10.8%	10.4%	11.0%	10.5%	14.0%
Mean	10.0%	8.6%	9.4%	9.6%	9.1%	9.1%	8.2%	8.1%	9.1%	8.6%	9.6%	9.6%	10.1%	10.1%	10.0%	10.5%	11.0%	**9.3%**	**9.7%**	**11.3%**	**11.6%**	**13.3%**
Median	10.0%	8.5%	9.5%	9.1%	8.8%	9.2%	8.9%	8.7%	8.9%	8.1%	9.3%	8.8%	9.4%	9.8%	10.6%	10.1%	10.9%	**9.1%**	**9.5%**	**11.0%**	**11.0%**	**14.0%**
D'Ascendis Water Group																						
American States Water Co.	9.8%	5.6%	7.3%	8.6%	8.3%	9.5%	8.8%	8.7%	11.2%	10.7%	12.6%	13.2%	12.1%	12.4%	12.3%	13.4%	11.6%	8.3%	11.8%	13.5%	13.0%	14.0%
American Water Works Co.							4.1%	5.1%	6.6%	7.2%	8.6%	8.0%	8.9%	9.5%	9.1%	8.0%	10.1%		8.1%	10.5%	10.5%	11.5%
Artesian Resources	9.2%	5.8%	7.3%	8.8%	7.9%	8.3%	7.3%	8.1%	8.1%	6.5%	8.5%	6.9%	7.7%	8.8%	9.5%	9.7%	9.5%	7.8%	8.3%			
California Water Service Group	9.7%	8.9%	9.7%	9.4%	7.9%	8.2%	10.0%	9.9%	8.8%	8.1%	9.3%	8.6%	9.3%	7.1%	7.4%	9.9%	9.2%	9.1%	8.8%	9.0%	11.0%	12.5%
Middlesex Water Co.	10.1%	8.1%	9.3%	8.7%	9.2%	8.9%	8.9%	7.1%	8.9%	7.5%	7.9%	8.8%	9.4%	9.8%	10.6%	10.1%	13.4%	9.0%	9.4%	12.5%	13.0%	14.5%
York Water Co.	10.4%	11.8%	11.3%	11.8%	10.9%	9.7%	9.4%	9.8%	10.1%	9.7%	9.5%	9.5%	11.0%	11.6%	10.6%	11.1%	10.9%	10.8%	10.4%	11.0%	10.5%	14.0%
Mean	9.8%	8.0%	9.0%	9.5%	8.8%	8.9%	8.1%	8.1%	9.0%	8.3%	9.4%	9.2%	9.7%	9.9%	9.9%	10.4%	10.8%	**9.0%**	**9.5%**	**11.3%**	**11.6%**	**13.3%**
Median	9.8%	8.1%	9.3%	8.8%	8.3%	8.9%	8.9%	8.4%	8.9%	7.8%	9.0%	8.7%	9.4%	9.7%	10.1%	10.0%	10.5%	**8.9%**	**9.2%**	**11.0%**	**11.0%**	**14.0%**

Source: Calculations made from data contained in Value Line Investment Survey (January 10, 2020).

PROXY COMPANIES
MARKET-TO-BOOK RATIOS

Company	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2002-08 Average	2009-18 Average
Value Line Water Group																			
American States Water Co.	181%	181%	164%	192%	229%	233%	194%	184%	179%	160%	183%	235%	253%	307%	321%	356%	404%	196%	258%
American Water Works Co.							74%	81%	97%	122%	144%	159%	180%	197%	251%	274%	278%		178%
Aqua America, Inc.	289%	295%	291%	383%	376%	319%	226%	231%	237%	245%	253%	295%	283%	291%	316%	322%	321%	311%	279%
Artesian Resources	141%	158%	197%	214%	164%	178%	137%	131%	146%	138%	160%	167%	157%	171%	202%	233%	228%	170%	173%
California Water Service Group	182%	200%	213%	233%	232%	217%	196%	206%	178%	170%	164%	175%	182%	172%	218%	279%	285%	210%	203%
Middlesex Water Co.	233%	247%	246%	249%	208%	190%	159%	145%	158%	160%	163%	176%	178%	197%	266%	288%	323%	219%	205%
SJW Group					287%	279%	205%	176%	182%	171%	171%	178%	176%	173%	217%	266%	222%		193%
York Water Co.	282%	287%	287%	311%	340%	288%	188%	212%	218%	232%	233%	252%	267%	279%	366%	394%	334%	283%	279%
Mean	218%	228%	233%	264%	262%	243%	172%	171%	174%	175%	184%	205%	210%	223%	270%	302%	299%	**232%**	**221%**
Median	208%	224%	230%	241%	232%	233%	191%	180%	179%	165%	168%	177%	181%	197%	259%	284%	303%	**223%**	**209%**
Parcell Proxy Group																			
American States Water Co.	181%	181%	164%	192%	229%	233%	194%	184%	179%	160%	183%	235%	253%	307%	321%	356%	404%	196%	258%
American Water Works Co.							74%	81%	97%	122%	144%	159%	180%	197%	251%	274%	278%		178%
California Water Service Group	182%	200%	213%	233%	232%	217%	196%	206%	178%	170%	164%	175%	182%	172%	218%	279%	285%	210%	203%
Middlesex Water Co.	233%	247%	246%	249%	208%	190%	159%	145%	158%	160%	163%	176%	178%	197%	266%	288%	323%	219%	205%
York Water Co.	282%	287%	287%	311%	340%	288%	188%	212%	218%	232%	233%	252%	267%	279%	366%	394%	334%	283%	279%
Mean	220%	229%	228%	246%	252%	232%	162%	166%	166%	169%	177%	199%	212%	230%	284%	318%	325%	**227%**	**225%**
Median	208%	224%	230%	241%	231%	225%	188%	184%	178%	160%	164%	176%	182%	197%	266%	288%	323%	**221%**	**212%**
D'Ascendis Water Group																			
American States Water Co.	181%	181%	164%	192%	229%	233%	194%	184%	179%	160%	183%	235%	253%	307%	321%	356%	404%	196%	258%
American Water Works Co.							74%	81%	97%	122%	144%	159%	180%	197%	251%	274%	278%		178%
Artesian Resources	141%	158%	197%	214%	164%	178%	137%	131%	146%	138%	160%	167%	157%	171%	202%	233%	228%	170%	173%
California Water Service Group	182%	200%	213%	233%	232%	217%	196%	206%	178%	170%	164%	175%	182%	172%	218%	279%	285%	210%	203%
Middlesex Water Co.	233%	247%	246%	249%	208%	190%	159%	145%	158%	160%	163%	176%	178%	197%	266%	288%	323%	219%	205%
York Water Co.	282%	287%	287%	311%	340%	288%	188%	212%	218%	232%	233%	252%	267%	279%	366%	394%	334%	283%	279%
Mean	204%	215%	221%	240%	235%	221%	158%	160%	163%	164%	175%	194%	203%	221%	271%	304%	309%	**216%**	**216%**
Median	182%	200%	213%	233%	229%	217%	174%	165%	168%	160%	164%	176%	181%	197%	259%	284%	304%	**207%**	**206%**

Source: Calculations made from data contained in Value Line Investment Survey (January 10, 2020).

STANDARD AND POOR'S 500 COMPOSITE RATES OF RETURN ON AVERAGE COMMON EQUITY AND MARKET TO BOOK RATIOS

Year	Return on Average Equity	Market-To-Book Ratio
2002	8.4%	295%
2003	14.2%	278%
2004	15.0%	291%
2005	16.1%	278%
2006	17.0%	277%
2007	12.8%	284%
2008	3.0%	224%
2009	10.6%	187%
2010	14.2%	208%
2011	14.6%	207%
2012	13.5%	214%
2013	14.5%	237%
2014	14.2%	268%
2015	12.1%	273%
2016	12.7%	271%
2017	13.9%	310%
2018	16.1%	316%
Averages:		
2002-2008	**12.4%**	**275%**
2009-2018	**13.6%**	**249%**

Source: Standard & Poor's.

PROXY COMPANIES
RISK INDICATORS

Company	Value Line Safety Rank	Value Line Beta	Value Line Financial Strength	
Value Line Water Group				
American States Water Co.	2	0.65	A	4.00
American Water Works Co.	3	0.55	B+	3.33
Aqua America, Inc.	2	0.65	A	4.00
Artesian Resources	3	0.65	B	3.00
California Water Service Group	3	0.70	B++	3.67
Middlesex Water Co.	2	0.75	B++	3.67
SJW Group	3	0.60	B+	3.33
York Water Co.	3	0.70	B+	3.33
Mean	**2.6**	**0.66**	**B+/B++**	**3.54**
Parcell Proxy Group				
American States Water Co.	2	0.65	A	4.00
American Water Works Co.	3	0.55	B+	3.33
California Water Service Group	3	0.70	B++	3.67
Middlesex Water Co.	2	0.75	B++	3.67
York Water Co.	3	0.70	B+	3.33
Mean	**2.6**	**0.67**	**B++**	**3.60**
D'Ascendis Water Group				
American States Water Co.	2	0.65	A	4.00
American Water Works Co.	3	0.55	B+	3.33
Artesian Resources	3	0.65	B	3.00
California Water Service Group	3	0.70	B++	3.67
Middlesex Water Co.	2	0.75	B++	3.67
York Water Co.	3	0.70	B+	3.33
Mean	**2.7**	**0.67**	**B+/B++**	**3.50**

Source: Value Line Investment Survey (January 10, 2020).

PROXY COMPANIES AND STANDARD & POOR'S 500 RISK INDICATORS

Group	Value Line Safety Rank	Value Line Beta	Value Line Financial Strength
S&P 500	**2.4**	**1.04**	**B++**
Value Line Water Group	**2.6**	**0.66**	**B+/B++**
Parcell Proxy Group	**2.6**	**0.67**	**B++**
D'Ascendis Water Group	**2.7**	**0.67**	**B+/B++**

Source: Value Line Investment Survey (January 10, 2020).

Definitions:

Safety rankings are in a range of 1 to 5, with 1 representing the highest safety or lowest risk.

Beta reflects the variability of a particular stock, relative to the market as a whole. A stock with a beta of 1.0 moves in concert with the market; a stock with a beta below 1.0 is less variable than the market; and a stock with a beta above 1.0 is more variable than the market.

Financial strengths range from C to A++, with the latter representing the highest level.

Common stock rankings range from D to A+, with the latter representing the highest level.

WATER UTILITIES
RISK MEASURES COMPARED TO SIZE

Company	Market Capitalization ($000)	Value Line Beta	Value Line Safety	S&P Bond Rating
Value Line Water Utility Group				
York Water Co.	$600,000	0.70	3	A-
Middlesex Water Co.	$1,100,000	0.75	2	A
SJW Group	$2,000,000	0.60	3	A-
California Water Service Group	$2,500,000	0.70	3	A+
American States Water Co.	$3,200,000	0.65	2	A+
Aqua America, Inc.	$10,200,000	0.65	2	A
American Water Works Co.	$22,200,000	0.55	3	A

Sources: Value Line (January 10, 2020), S&P.

PUBLIC UTILITY RISK INDICATORS
RANKED BY SIZE

COMPANY	2019 CAP ($000) Value Line	SAFETY	BETA	FIN STR	S&P BOND RATING AUS	MOODY'S BOND RATING AUS
Otter Tail Corp	$2,000,000	2	0.65	A	BBB	Baa2
El Paso Electric Co.	$2,700,000	2	0.70	B++	BBB	Baa1
MGE Energy Inc.	$2,700,000	1	0.55	A+	AA-	A1
Avista Corp.	$3,000,000	2	0.60	A	BBB	Baa2
NorthWestern	$3,700,000	2	0.60	B++	BBB	Baa2
PNM Resources	$3,900,000	3	0.60	B+	BBB+	Baa3
ALLETE	$4,500,000	2	0.65	A	BBB+	Baa1
Black Hills Corp.	$4,800,000	2	0.75	A	BBB+	Baa2
Hawaiian Electric Industries, Inc.	$4,800,000	2	0.55	A	BBB-	Baa2
Portland General	$4,900,000	2	0.60	B++	BBB+	A3
$5 Billion or Less		2.0	0.63	A/B++	BBB+	Baa1
IDACORP	$5,300,000	2	0.60	A	BBB	Baa1
OGE Energy Corp.	$8,700,000	2	0.80	A	BBB+	Baa1
Pinnacle West Capital Corp.	$10,000,000	1	0.55	A+	A-	A3
Alliant Energy	$12,700,000	2	0.60	A	A-	Baa1
CenterPoint Energy, Inc.	$14,000,000	3	0.80	B+	BBB+	Baa2
Evergy, Inc.	$15,000,000	2	nmf	B++	A-	Baa2
$5 Billion to $15 Billion		2.0	0.67	A	BBB+	Baa1
AVANGRID, Inc.	$16,000,000	2	0.40	B++	BBB+	Baa1
CMS Energy Corp.	$18,000,000	2	0.55	B++	BBB+	Baa1
Ameren Corp.	$19,000,000	2	0.55	A	BBB+	Baa1
PPL Corp	$21,000,000	2	0.65	B++	A-	Baa2
Edison International	$23,000,000	3	0.60	B+	BBB	Baa3
Entergy Corp.	$23,000,000	3	0.60	B++	BBB+	Baa2
FirstEnergy Corp.	$23,000,000	2	0.60	B++	BBB	Baa3
DTE Energy Company	$24,000,000	2	0.55	B++	BBB+	Baa1
Eversource Energy	$25,000,000	1	0.60	A	A-	Baa1
Fortis	$25,000,000	2	0.65	B++	A-	Baa3
$15 Billion to $25 Billion		2.1	0.58	B++	BBB+	Baa1/Baa2
Consolidated Edison, Inc.	$29,000,000	1	0.45	A+	A-	Baa1
Public Service Enterprise Group, Inc.	$29,000,000	1	0.65	A++	BBB+	Baa1
WEC Energy Group	$31,000,000	1	0.50	A+	A-	Baa1
Xcel Energy Inc.	$31,000,000	1	0.50	A+	A-	Baa1
Sempra Energy	$38,000,000	2	0.75	A	BBB+	Baa1
Exelon Corp.	$44,000,000	2	0.70	B++	BBB+	Baa2
American Electric Power Company	$46,000,000	1	0.55	A+	A-	Baa1
Dominion Energy	$60,000,000	2	0.55	B++	BBB+	Baa2
Southern Company	$60,000,000	2	0.50	A	A-	Baa2
Duke Energy Corp.	$65,000,000	2	0.50	A	A-	Baa1
NextEra Energy, Inc.	$101,000,000	1	0.55	A+	A-	Baa1
Over $25 Billion		1.5	0.56	A	A-/BBB+	Baa1

Sources:

Value Line Investment Survey
East -- August 16, 2019
Central -- September 13, 2019
West -- July 26, 2019

Moody's website - accessed August 19, 2019

S&P website - accessed August 19, 2019